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Aggregate Productivity Measures

1994

Feature Article:

- Methodology used to Produce Advance Estimates of Multifactor Productivity Indexes for the Canadian Aggregate Business Sector

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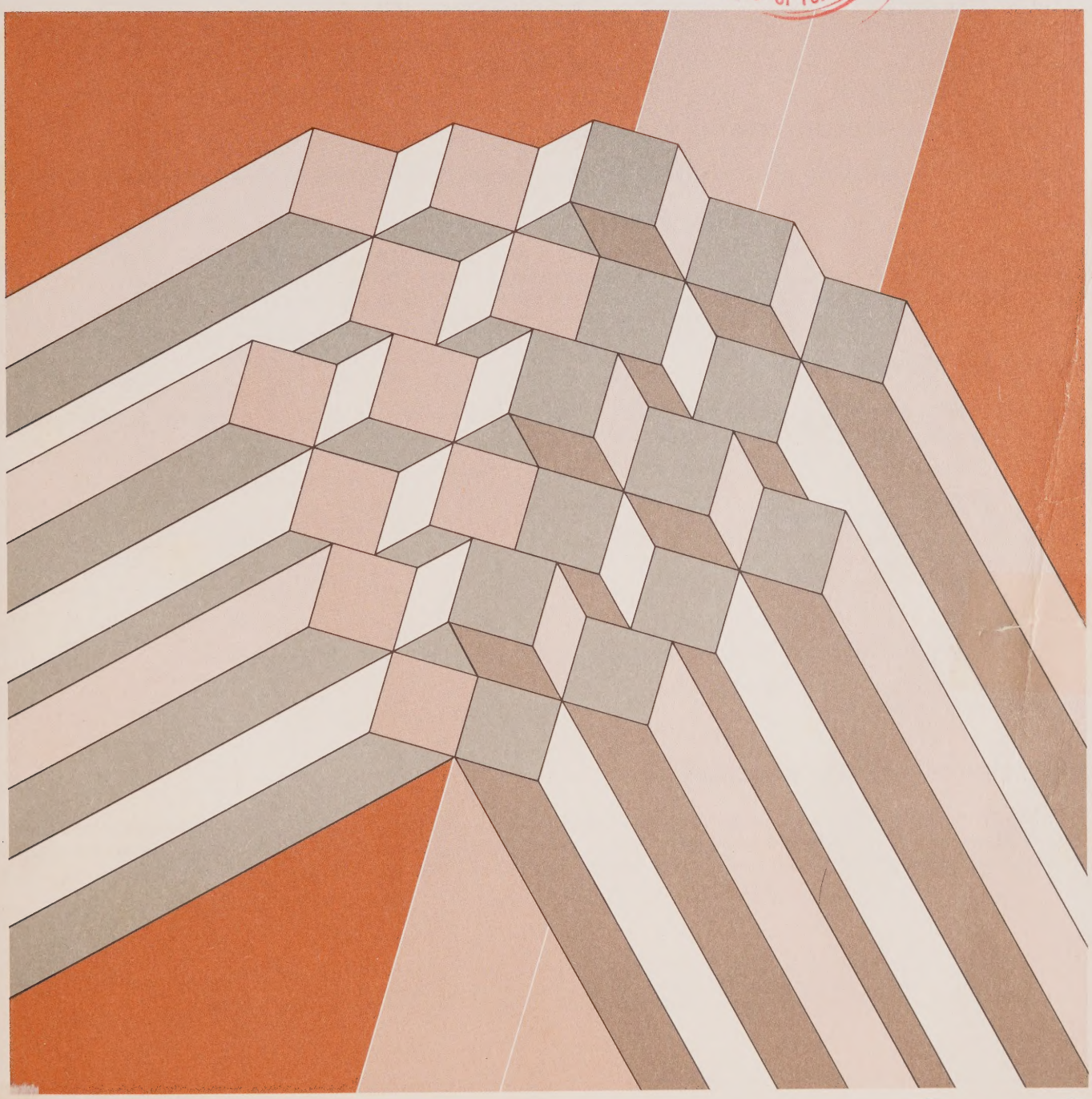

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Statistics Canada
Input-Output Division

System of National Accounts

Aggregate Productivity Measures

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March 1996

Price: Canada: $44.00 annually
United States: US$53.00 annually
Other countries: US$62.00 annually

Catalogue no. 15-204-XPE
Frequency: Annual

ISSN 0317-7882

Ottawa

La version française de cette publication est disponible sur demande (N° 15-204-XPF au catalogue).

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Symbols

The following standard symbols are used in Statistics Canada publications:

..	figures not available.
...	figures not appropriate or not applicable.
-	nil or zero.
–	amount too small to be expressed.
p	preliminary figures.
r	revised figures.
x	confidential to meet secrecy requirements of the Statistics Act.

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The System of National Accounts

In Canada, the National Accounts have been developed since the close of the Second World War in a series of publications relating to their constituent parts. These have now reached a stage of evolution where they can be termed a "System of National Accounts". For purposes of identification, all publications (containing tables of statistics, descriptions of conceptual frameworks and descriptions of sources and methods) which make up this System carry the term "System of National Accounts" as a general title.

The System of National Accounts in Canada consists of several parts. The annual and quarterly Income and Expenditure Accounts (included with Catalogue Nos. carrying the prefix 13) were, historically speaking, the first set of statistics to be referred to with the title "National Accounts" (National Accounts, Income and Expenditure). The Balance of International Payments data (Catalogue Nos. with prefix 67), are also part of the System of National Accounts and they, in fact, pre-date the Income and Expenditure Accounts.

Greatly expanded structural detail on industries and on goods and services is portrayed in the Input-Output Tables of the System (Catalogue Nos. with prefix 15). The Catalogue Nos. carrying the prefix 15 also provide measures of the contribution of each industry to total Gross Domestic Product at factor cost as well as Productivity Measures.

Both the Input-Output tables and estimates of Gross Domestic Product by industry use the establishment as the primary unit of industrial production. Measures of financial transactions are provided by the Financial Flow Accounts (Catalogue Nos. with prefix 13). Types of lenders and financial instruments are the primary detail in these statistics and the legal entity is the main unit of classification of transactors. Balance sheets of outstanding assets and liabilities are published annually.

The System of National Accounts provides an overall conceptually integrated framework in which the various parts can be considered as interrelated sub-systems. At present, direct comparisons amongst those parts which use the establishment as the basic unit and those which use the legal entity can be carried out only at highly aggregated levels of data. However, Statistics Canada is continuing research on enterprise-company-establishment relationships; it may eventually be feasible to reclassify the data which are on one basis (say the establishment basis) to correspond to the units employed on another (the company or the enterprise basis).

In its broad outline, the Canadian System of National Accounts bears a close relationship to the international standard as described in the United Nations publication: A System of National Accounts (Studies in Methods, Series F, No. 2 Rev. 3, Statistical Office, Department of Economic and Social Affairs, United Nations, New York, 1968).

Table of Contents

Page

Introduction 9

Highlights

1 - Productivity in Canada 11
2 - Productivity by final demand categories 13
3 - Productivity comparisons between Canada and the United States 14

FEATURE ARTICLE

Methodology used to Produce Advance Estimates of Multifactor Productivity Indexes for the Canadian Aggregate Business Sector

1 - Introduction 23
2 - The Need for Advance Estimation 23
3 - Compilation and Estimation of the Proxies 24
4 - Estimates and Forecasts of the Variables 27

PART 1

Multifactor productivity based on value-added

Table 1 - Business sector - Törnqvist indices of multifactor productivity based on real value-added and related data 33
Table 2 - Breakdown of annual growth in real value added, business sector industries 34
Table 3 - Manufacturing industries - Törnqvist indices of multifactor productivity based on real value-added and related data 35
Table 4 - Breakdown of annual growth in real value added, manufacturing industries 36

Indices of multifactor productivity and related variable

Table 5 - Agricultural & related services industries 37
Table 6 - Manufacturing industries 38
Table 7 - Construction industries 39
Table 8 - Transportation & storage industries 40
Table 9 - Telecommunication industries 41

Table 10 - Wholesale trade industries 42
Table 11 - Retail trade industries 43
Table 12 - Food industries 44
Table 13 - Beverage industries 45
Table 14 - Tobacco products industries 46
Table 15 - Rubber products industries 47
Table 16 - Plastic products industries 48
Table 17 - Leather & allied products industries 49
Table 18 - Primary textile & textile products industries 50
Table 19 - Clothing industries 51
Table 20 - Wood industries 52
Table 21 - Furniture & fixture industries 53
Table 22 - Paper & allied products industries 54
Table 23 - Printing, publishing & allied industries 55
Table 24 - Primary metal industries 56
Table 25 - Fabricated metal products industries 57
Table 26 - Machinery industries 58
Table 27 - Transportation equipment industries 59
Table 28 - Electrical & electronic products industries 60
Table 29 - Non-metallic mineral products industries 61
Table 30 - Refined petroleum & coal products 62
Table 31 - Chemical & chemical products industries 63
Table 32 - Other manufacturing industries 64

PART 2

Indices of labour productivity and unit labour cost

Table 1 - Business sector industries 67
Table 2 - Business sector-excluding agricultural & related services industries 68
Table 3 - Business sector-services 69
Table 4 - Business sector-goods 70
Table 5 - Agricultural & related services industries 71
Table 6 - Manufacturing industries 72
Table 7 - Construction industries 73
Table 8 - Transportation & storage industries 74
Table 9 - Communication industries 75
Table 10 - Wholesale trade industries 76
Table 11 - Retail trade industries 77

Table 12 - Community, business, personal services industries 78
Table 13 - Food industries 79
Table 14 - Beverage industries 80
Table 15 - Tobacco products industries 81
Table 16 - Rubber products industries 82
Table 17 - Plastic products industries 83
Table 18 - Leather & allied products industries 84
Table 19 - Primary textile & textile products industries 85
Table 20 - Clothing industries 86
Table 21 - Wood industries 87
Table 22 - Furniture & fixture industries 88
Table 23 - Paper & allied products industries 89
Table 24 - Printing, publishing & allied industries 90
Table 25 - Primary metal industries 91
Table 26 - Fabricated metal products industries 92
Table 27 - Machinery industries 93
Table 28 - Transportation equipment industries 94
Table 29 - Electrical & electronic products industries 95
Table 30 - Non-metallic mineral products industries 96
Table 31 - Refined petroleum & coal products industries 97
Table 32 - Chemical & chemical products industries 98
Table 33 - Other manufacturing industries 99

PART 3

Miscellaneous tables

Table 1 - Productivity indices by final demand category 103
Table 2 - Percentage distribution of net final sales by final demand category 103
Table 3 - Productivity growth contributions by final demand category 103
Table 4 - Productivity indices of exports by commodity groups 104
Table 5 - Percentage distribution of exported net final sales by commodity groups 105
Table 6 - Productivity growth contributions to total exports, by commodity groups 106
Table 7 - Multifactor productivity indices for comparable manufacturing industries in Canada and the United States 107

APPENDIXES

APPENDIX 1 - Basic Concepts and Methods 113

1 - Labour Productivity and Unit Labour Costs 113
2 - Multifactor productivity 116

APPENDIX 2 - Sources of Data 121

1 - Description of Labour Productivity Data 121
2 - Description of Multifactor Productivity Data 125

APPENDIX 3 - Aggregation Parameters for Productivity Measures 127

APPENDIX 4 - Quality Rating of Productivity Estimates and Related Data 133

1 - Quality Rating of Labour Productivity Estimates and Related Data 133
2 - Quality Rating of Multifactor Productivity Estimates and Related Data 136

APPENDIX 5 - Productivity and Related Data in CANSIM 139

Multifactor Productivity 139
Labour Productivity 139

Introduction

As in previous ones, this issue of *Aggregate Productivity Measures* introduces a number of changes to the presentation of the estimates. The multifactor productivity indices based on gross output are now presented with aggregate measures of inputs and outputs from our KLEMS data base which was described in the 1992 issue of this catalogue[1]. The capital, labour, energy, materials and services input indices together with the index of output are now presented in lieu of the corresponding partial productivity estimates as in the previous issue. All these indices are chained Törnqvist indices but other indices (Paasche, Laspeyres and Fisher Ideal) are available on request. These changes should be more useful to our readers as the KLEMS database may be used to compute partial productivity indices, if needed, as well as other indicators.

At the aggregate business sector level and for total manufacturing, productivity estimates are now presented in both rates of change and index levels, rather than rates of change only in order to facilitate the comparison with disaggregated industry indices. The expression net-gross output which was a short form used for gross output net of intra-industry sales has been suppressed and replaced everywhere by the complete expression. In the tables, the corresponding productivity indices are now more simply called intra-industrial to distinguish them from the industrial and interindustrial indices.

The most conspicuous change to the presentation, however, pertains to the introduction of new productivity estimates associated with final demand categories of expenditure. Previously, we presented the interindustry multifactor productivity indices that may be associated with either industries' gross output or with their final sales to all final demand users. Re-weighting these commodity bundle indices according to the basket of goods purchased in each category of final demand provides an alternative interesting way of looking at productivity results. One may, for instance, compare the productivity growth generated in the Canadian economy by the industrial activities that support consumer durable goods as opposed to the efficiency gains generated by the activities supporting government purchases of goods and services. One may also proceed with a detailed analysis of productivity gains associated with our exports of these bundles bringing us one step forward in the analysis of competitiveness. For convenience, final demand has been broken down into 11 categories although results are available on request for the 128 categories included in the Input-Output Tables. Our highlights section briefly describes the movement of these new indices.

New capital stock data based on the 1980 SIC have been used to produce the revised estimates going back to 1961. These new capital data now permit the breakdown of the business sector into 122 industries rather than the 111 industries of the previous classification. The use of new capital stock data has made possible the introduction of estimates for Postal Services and Other Utilities within the business sector. The revised industrial classification used for the Multifactor Productivity Accounts is closer to that of the Input-Output Accounts.

Only Laundries & Cleaners (L code 151) and Other Personal Services (L code 152) are still excluded from the business sector estimates for lack of capital data. These industries account for only a small part of business sector output. Their aggregate gives the Personal & Household industry (M medium level code 46). Thus, all M level industries are now covered with the exception of M code 46. Since the excluded industries have only a minor impact on Community, Personal and Business Services industries our productivity indices cover virtually the S small level

1. See Johnson, J., "A KLEMS Database: Describing the Input Structure of Canadian Industry", in *Aggregate Productivity Measures*, 1992, Catalogue No. 15-204E, pp. 19-32.

of aggregation. Our concordance Tables in Appendix 3 have been revised to reflect these changes.

Another important change is related to the estimation of hours worked. Hours worked have been disaggregated to the input-output L link level code comprising 154 business industries with the exception of Government Royalties on Natural Resources and Owners Occupied Dwellings. Labour productivity and related variables estimates for the L level codes are available on request.

Tables comparing intra-industry productivity indices of manufacturing industries for Canada and United-States included in the Highlights of the previous issue will now be regularly included in the Section titled Miscellaneous Tables. This Section will also include a table reporting the new productivity estimates by final demand categories and a table disaggregating the productivity estimates of the export category into 35 commodity groupings.

Multifactor productivity, labour productivity and related data now incorporate revisions due to the completion of 1991 final and 1992 preliminary input-output benchmark tables, as well as consequent revisions to 1991-1994 compensation and real GDP data. The KLEMS database introduced in the 1992 issue of this publication has also been updated and is now available to users.

FOR FURTHER READING
Selected publications from Statistics Canada

The labour and multifactor productivity indexes presented in this publication are obtained mainly from a set of integrated industry and commodity statistics within the System of National Accounts (SNA). The integration ensures consistency of definition over time and across industry and commodity classifications and the information may therefore differ from other Statistics Canada data. Publications with a catalogue number prefix 15 contain SNA integrated data and are available under the following titles:

- Gross Domestic Product by Industry, Cat. No. 15-001.
- The Input-Output Structure of the Canadian Economy, Cat. No. 15-201.
- The Input-Output Structure of the Canadian Economy in Constant Prices, Cat. No. 15-202.
- The Input-Output Structure of the Canadian Economy, 1961-81, Cat. No. 15-510, occasional.
- The Input-Output Structure of the Canadian Economy in Constant Prices, 1961-81, Cat. No. 15-511, occasional.

Highlights

In Brief

- In 1994, Canadian businesses registered their best productivity performance in 10 years. Modest increases in wages and business restructuring efforts contributed to the second consecutive annual decrease in unit labour cost.
- Productivity grew on average at the same pace in Canada as in the United States between 1991 and 1994. However, much smaller increases in Canadian wages meant production costs grew more slowly in Canada than they did in the United States. This improvement in relative prices, combined with the decline in value of the Canadian dollar, helped maintain the expansion of Canadian exports to the United States that started in 1992.
- A trend comparison has revealed that American manufacturers have been outperforming Canadian manufacturers in multifactor productivity since 1985. An analysis of 15 comparable manufacturing industries shows that the gap is essentially due to the machinery, electrical and electronic products industries, which grew much faster in the United States than in Canada.

1 - Productivity in Canada

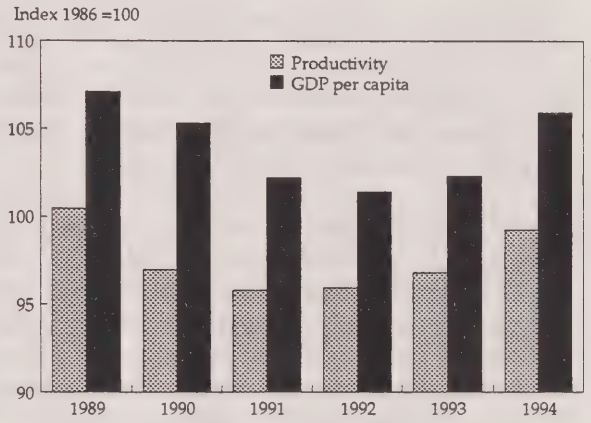
1.1 - Strong recovery in productivity in 1994

In 1994, Canadian businesses registered their best productivity[1] performance in 10 years. Modest wage increases and business restructuring efforts contributed to the second consecutive annual decrease in unit labour cost.

Despite 1994's productivity growth, the productivity index has still not regained its 1989 level. Not surprisingly, per capita Gross Domestic Product (GDP) in 1994 remained 1.1% below its 1989 level.

Figure 1

Productivity and Real GDP per capita are still below the level reached in 1989



1.2 - Productivity growth is less impressive than what was observed after the 1982 recession

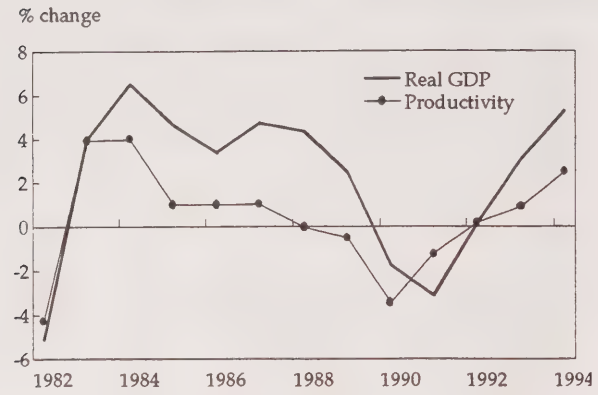
Canadian business's real GDP rose by 5.5% in 1994, finally exceeding the 1989 peak. By comparison, after the 1982 recession, production returned to its 1981 pre-recession peak in just three years. Thus, the latest period of contraction and recovery was more prolonged than that of the decade before.

As well, productivity growth was weaker after the latest recession. In 1993 and 1994, the first two years of significant recovery, productivity increased 0.9% and 2.5%, compared with the 4.0% and 3.9% registered in 1983 and 1984, the comparable phase in the business cycle.

1. Unless otherwise stated, the term «productivity» used in this publication refers to multifactor productivity measures based upon the value-added concept.

Figure 2

The business sector's current productivity growth is less impressive than during the post 1982 recovery



1.3 - Tighter reins on labour and modernization of equipment are partly responsible for slower productivity growth

The 1990-1992 recession was more protracted than the short, sharp recession of 1982. This forced Canadian businesses to trim their payrolls in response to decreased demand. The cumulative number of person-years lost during the latest recession was approximately two times greater than in 1982, although the peak-to-trough fall in real GDP was farther in 1982.

When this recovery began, businesses were forced to expand hours worked and hire new employees more quickly than after the 1982 recession. At that time, employers kept a greater proportion of their employees on the payroll, so when recovery came, less hiring was needed. The increase in hours worked and hirings that occurred in 1993 and 1994 partly offset the cyclical productivity gains usually registered at this stage of the recovery. The fact that labour productivity increased by 1.2% over the 1990-1992 recession, while it dropped by 0.8% in 1982, supports this interpretation.

Cyclical pattern of productivity measures

When businesses hear a sudden call to boost output, there is often a lag due to high hiring costs and the time it takes to buy and install new machinery and equipment. This time lag can be seen in cyclical fluctuations in productivity.

During a recession, productivity measures usually decrease or increase only slightly compared with their usual performance. Then, when recovery begins, they normally increase at a faster pace. It is important to consider these characteristics when interpreting the actual Canadian productivity performance.

Further, businesses modernized their production equipment to remain competitive to a greater degree than they did in 1982. Net investment in machinery and equipment was stronger during the latest recession and recovery than during the previous one. In the short run, however, modernization generally causes adjustments and training for labour which can delay productivity gains.

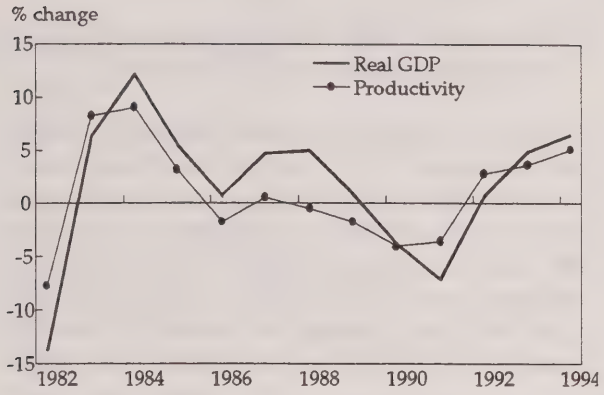
1.4 - Canadian manufacturers: The largest contributor

In 1994, as in 1993, Canadian manufacturers made the greatest contribution to the productivity gains in the business sector. The productivity index of manufacturers increased 6.1% in 1994, bringing it closer to its 1985 peak. Manufacturers, like the entire business sector, registered lower productivity growth after the 1990-1992 recession than they did after the 1982 recession.

The labour index, though only a partial measure of productivity, is the best tool for a more detailed analysis, since multifactor productivity estimates for 1994 are not available by industry. Labour productivity grew strongly in 1994 in the manufacturing sector, and in the agricultural, communication, retail trade, and wholesale trade industries. However, labour productivity decreased for a third consecutive year in the construction, commercial, business and personal services industries.

Figure 3

Productivity in the manufacturing sector posted its' best performance since 1984

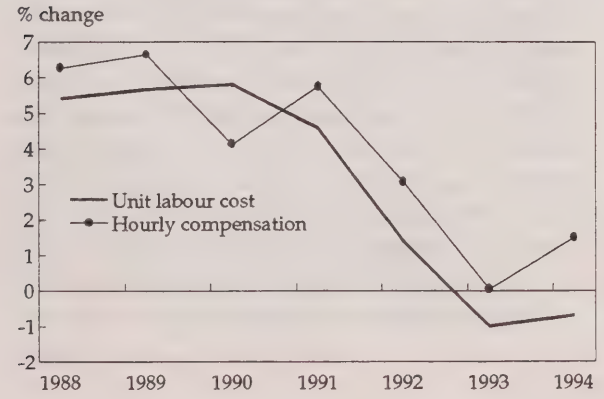


1.5 - Unit labour cost decreases for a second consecutive year

For the second consecutive year, Canadian businesses registered a drop in unit labour cost. The 0.7% drop in 1994 followed a 1.0% decline in 1993. These two years of decline stopped a trend of steadily rising unit labour costs since 1962. This decrease enabled Canadian businesses to limit the growth in their production unit cost, or price per unit produced, to 1.4% in 1994, and to increase their profits.

Figure 4

Unit labour cost continued to decline in 1994 despite increased hourly compensation in the business sector



In 1994, unit labour cost decreased both in the goods and services sectors. The most important decreases were observed in wholesale trade (-4.9%), communication (-4.2%), agriculture (-2.9%), retail trade (-1.8%), manufacturing (-1.3%) and transportation and storage (-0.5%).

1.6 - Compensation per hour increased slightly in 1994

The hourly compensation paid to workers in the business sector rose 1.5% in 1994. This was greater than the previous year's rise, but was still the second-lowest increase in hourly compensation since 1947, the earliest year for which this measure is available. The main causes of these small rises are the modest increases allowed by collective agreements and an excess supply of labour.

Structural changes in the economy, which have shifted the employment distribution by industry, have also contributed to a slowdown in the growth of the gross payroll indicator. Since 1989, the relative importance of the service sector, where the average salary is lower than in the goods-producing sector, has increased. The numbers of hours worked in the service sector increased 4.6% from 1989 to 1994, while it decreased 7.7% in the goods-producing sector.

2 - Productivity by final demand categories

2.1 - Overview

As mentioned in the introduction of this publication, we introduce this year, for the first time, productivity gain estimates associated with final demand users' expenditures. These estimates require a brief explanation.

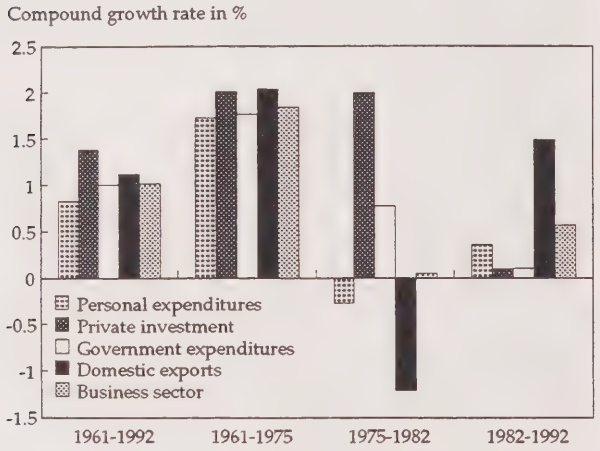
Business firms deliver commodities to final users-households, investors, governments and non-residents. Each of these agents has substantially different expenditure structures. But productivity gains made by firms also vary substantially from one commodity produced to another, as shown by the inter-industry multifactor productivity indexes. Hence, aggregate productivity, at the business sector level, depends on the relative growth of final users' demand.

2.2 - Business investments come first

Figure 5 shows the business sector's productivity growth according to its deliveries to four groupings of final demand users: household expenditure; business investment, including changes in inventories; government expenditures on goods and services, including government investment; and exports.

Figure 5

Productivity growth by final demand category



The business sector's largest productivity gains were in the production of business investment goods. Productivity gains on consumer expenditures ranked last. However, when final demand uses are broken down into the 11 categories shown in the Miscellaneous Tables Section, consumer durables and investments in machinery and equipment generated the greatest productivity gains. Productivity gains in household services were the weakest of all components of final demand, lowering the aggregate gains in the household expenditures category.

Productivity gains in exports were not much higher than the average gains of the business sector. However, Canadian exports are extremely diversified, and the average productivity gains shown in Figure 5 hide wide variations in individual categories. Table 1 illustrates that diversity.

Communications services posted the greatest productivity gains. However, these gains contributed little to productivity growth across the sector, because communications services represents such a tiny share of exports. In fact, the largest contributor to aggregate export productivity growth was transportation equipment followed by sawmill and other wood products.

3 - Productivity comparisons between Canada and the United States[2]

One could hardly talk about Canadian economic performance with respect to productivity growth and, in particular, of our export-related productivity, without comparing it with that of the United States, our major trading partner. In the eighties, our exchanges of goods and services with this country intensified so that they now amount to close to 80% of all of our exports.

3.1 - Canadian business performance continued to improve in 1994

In 1994, Canadian businesses recorded their best productivity gains in 10 years. Productivity grew by 2.5% in Canada, compared with 0.7% in the United States. As is also true for output and hours worked, a trend analysis shows that the cyclical pattern of the productivity index had more amplitude in Canada than in the United States. Despite these greater fluctuations, Canadian business productivity grew on average at the same pace as U.S. productivity between 1982 and 1994, and in fact since 1961. This indicates that the relative position of Canada in comparison with the United States did not change over the past three decades.

However, there are positive signs for Canada's competitive position in our hourly compensation and unit labour costs. Hourly compensation in the Canadian business sector grew by only 1.5% in 1994, compared with 2.7% in the United States. The combination of low wage increases and productivity improvement caused a second consecutive decrease in unit labour costs for the Canadian business sector, a result not seen in 48 years. In the United States, unit labour costs rose 0.7% during the same period.

2. Productivity and related data from the United States used in this publication were released by the U.S. Bureau of Labor Statistics.

Table 1 - Productivity gains of exports by commodity (1961-1992)

Commodities	Productivity gains	
	Average annual % change	Average relative contribution*
Communication services	3.29	0.92
Textile products	3.21	1.23
Lumber, sawmill, other wood products	2.75	14.35
Forestry products	2.66	0.74
Autos, trucks, other transp. equipment	2.61	29.17
Transportation margins	2.59	13.34
Electrical & communications products	2.53	4.92
Other agricultural products	2.42	4.15
Grains	2.28	11.67
Knitted products & clothing	2.26	0.56
Rubber, leather, plastic fab.pro	2.09	1.03
Miscellaneous manufactured products	1.91	1.81
Wholesale margins	1.89	5.36
Fruit, vegetable, feed, misc.food products	1.86	2.45
Chemicals, chemical products	1.85	4.77
Machinery & equipment	1.82	5.01
Transportation & storage	1.79	6.44
Metal fabricated products	1.60	1.46
Tobacco & tobacco products	1.56	0.54
Non-metallic mineral products	1.35	0.64
Other utilities	1.29	0.55
Meat, fish & dairy products	1.25	3.28
Furniture & fixtures	1.15	0.06
Beverages	1.12	1.84
Metallic ores & concentrates	0.89	3.12
Paper & paper products	0.67	6.30
Primary metal products	0.67	3.63
Printing & publishing	0.46	-0.01
Fishing & trapping products	0.30	-0.07
Business services	0.10	-0.13
Personal & other misc. services	-0.11	-0.48
Other finance, insurance, real estate	-0.37	-0.22
Petroleum & coal products	-1.09	-4.90
Non-metallic minerals	-1.37	-1.56
Mineral fuels	-2.52	-21.97
Domestic exports	1.12	100.00

* Average of the annual value share weighted productivity gains in proportion of total exports productivity gains

Figure 6

The relative position of Canadian businesses, in terms of productivity, did not change over the past three decades

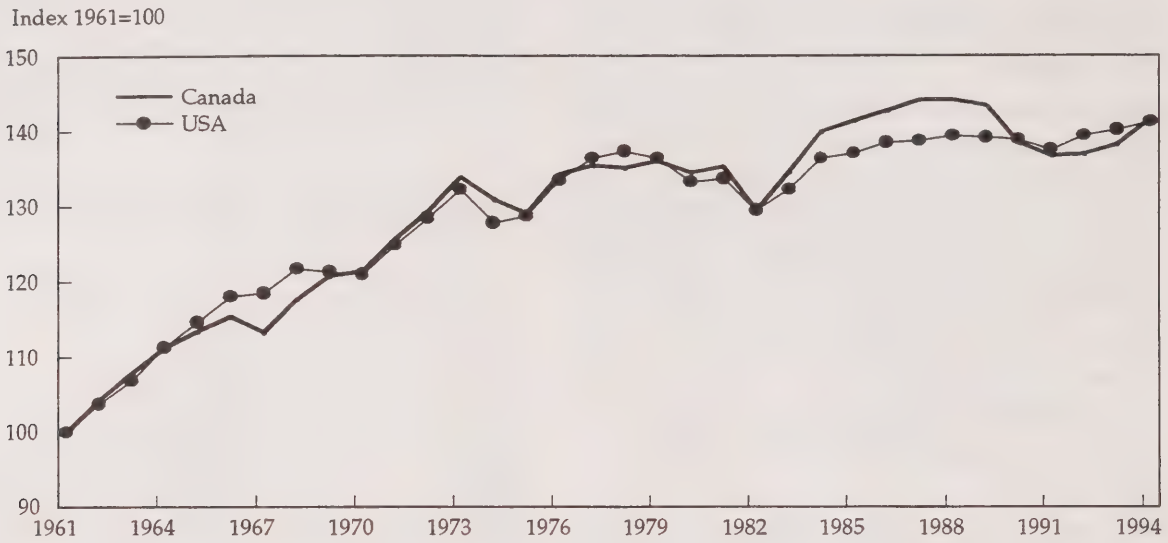


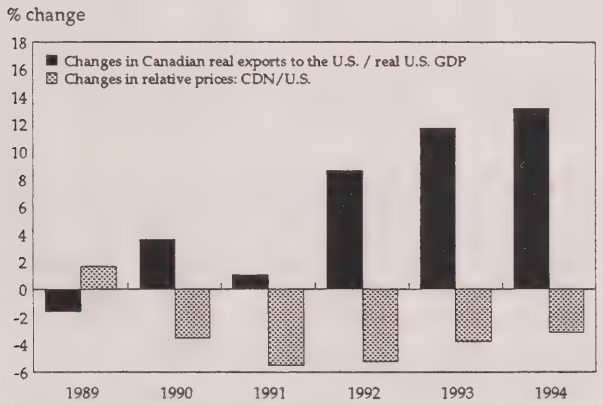
Table 2 - Growth rates of business sector performance indicators for Canada and the United States

Year	Multifactor productivity		Labour productivity		Hourly compensation		Unit labour cost		Canadian unit labour cost in U.S. $
	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	
1981	0.6	0.3	2.1	1.3	12.9	9.4	10.6	8.0	7.8
1982	-4.3	-3.1	-0.8	0.1	10.0	7.5	11.0	7.4	7.8
1983	3.9	2.1	4.1	2.3	4.9	3.8	0.8	1.5	0.9
1984	4.0	3.1	3.5	2.4	5.1	4.4	1.5	1.9	-3.4
1985	1.0	0.5	0.5	1.4	3.8	4.5	3.2	3.0	-2.1
1986	1.0	1.0	1.5	2.1	4.8	4.9	3.2	2.8	1.4
1987	1.0	0.2	1.1	1.0	5.9	3.6	4.8	2.6	9.8
1988	0.0	0.5	0.8	1.0	6.3	4.4	5.4	3.3	13.6
1989	-0.5	-0.2	0.9	-0.7	6.6	3.5	5.7	4.3	9.9
1990	-3.4	-0.2	-1.6	0.7	4.1	5.7	5.8	5.0	7.3
1991	-1.2	-1.0	1.1	1.3	5.7	4.8	4.6	3.5	6.5
1992	0.2	1.4	1.6	3.0	3.1	5.1	1.4	2.1	-3.9
1993	0.9	0.5	1.1	1.3	0.1	3.4	-1.0	2.0	-7.2
1994	2.5	0.8	2.2	2.1	1.5	2.7	-0.7	0.7	-6.2

When currency exchange rates are taken into account, unit labour costs in the Canadian business sector look even better. Canadian unit labour costs measured in U.S. dollars fell by 6.2% in 1994. Since U.S. unit labour costs continued to increase in 1994, there was a gap of 7.0% between the Canadian and U.S. business sector. This improvement in relative prices in Canada contributed to the recent surge of Canadian real exports to the United States. The ratio of Canadian real exports to the U.S. in proportion to real U.S. GDP has increased significantly from 2.2% in 1991 to 3.0% in 1994 (see figure 7) so that the increase in these exports during this period was not just a reflection of growth in the American economy.

Figure 7

Canadian exports to the U.S. are sensitive to changes in relative prices



3.2 - Unit labour costs in manufacturing drop more in United States

Manufactured goods represent more than 75% of all Canadian exports including services to the United States. So it is particularly interesting to examine the manufacturing industries in each country in more detail.

Aggregate measures of productivity in the Canadian and U.S. manufacturing sectors show that, before exchange rates are taken into account, the Canadian sector lost some competitive ground in 1994 (see table 3). Canadian manufacturing wages increased by 2.9%, while U.S. wages rose only by 1.6% in 1994. Since labour productivity grew similarly, manufacturing unit labour costs dropped by 1.3% in Canada, compared with 2.3% in the United States.

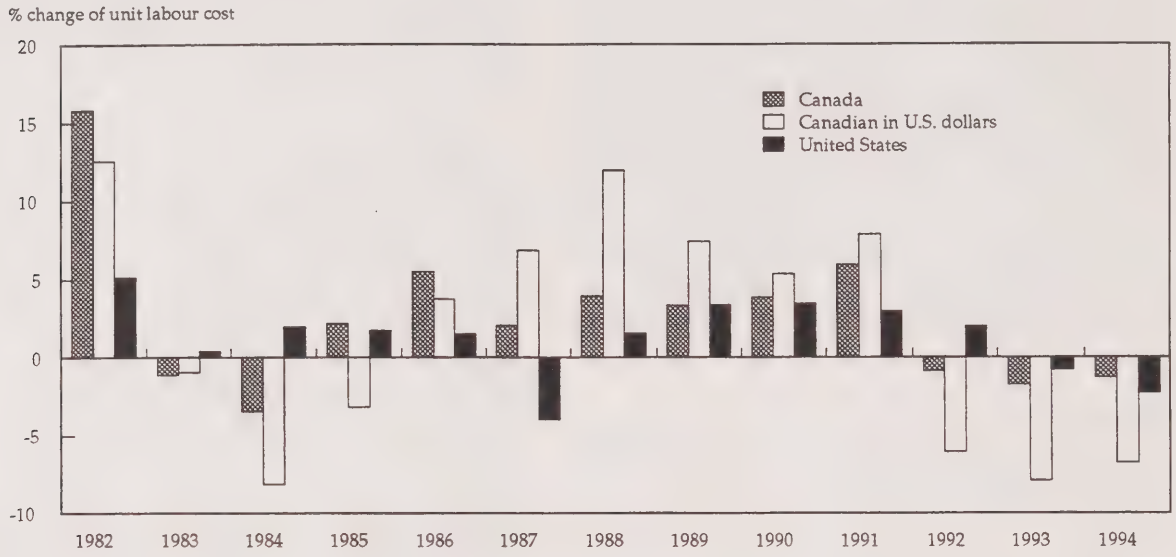
As in the entire business sector, when the 1994 unit labour costs are corrected for the exchange rate, Canadian manufacturers enjoyed an attractive competitive position for a third consecutive year (see figure 8). Canadian unit labour costs measured in U.S. dollars fell by 6.8% in 1994. This drop leaves a gap of 4.5% in favour of Canadian manufacturers, lower than in the two previous years.

Table 3 - Growth rates of manufacturing industries performance indicators for Canada and the United States

Year	Labour productivity		Hourly compensation		Unit labour cost		Canadian unit labour cost in U.S. $.
	Canada	U.S.	Canada	U.S.	Canada	U.S.	
1981	4.9	3.6	15.1	9.8	9.7	6.1	7.0
1982	-4.5	4.0	10.6	9.3	15.8	5.2	12.6
1983	7.3	2.2	6.1	2.7	-1.1	0.4	-1.0
1984	8.5	1.3	4.7	3.2	-3.4	2.0	-8.1
1985	2.9	3.1	5.2	5.0	2.2	1.8	-3.1
1986	-1.6	2.6	3.9	4.0	5.5	1.5	3.8
1987	0.9	6.5	3.0	2.2	2.0	-4.0	6.9
1988	0.4	2.2	4.4	3.9	4.0	1.6	12.0
1989	0.4	0.6	3.8	5.3	3.3	3.4	7.4
1990	1.7	1.8	5.6	5.3	3.9	3.5	5.4
1991	0.4	2.3	6.4	5.3	5.9	3.0	7.9
1992	3.9	2.1	3.0	4.2	-0.9	2.0	-6.0
1993	2.4	3.5	0.6	2.8	-1.7	0.8	-7.9
1994	4.2	4.1	2.9	1.6	-1.3	-2.3	-6.8

Figure 8

The competitiveness of Canadian manufacturers continues to benefit from the devaluation of the dollar



3.3 - Manufacturing productivity growth in Canada and the United States

Manufacturing productivity, based upon intra-industry indexes, are comparable for 15 industry groups up to 1992 and the whole Canadian and U.S manufacturing sector up to 1993.[3] A detailed analysis of productivity indexes for the 15 industry groups points out the best-performing industries in the two countries.

Between 1961 and 1993, productivity growth was greater in U.S. manufacturing than in Canada's. The U.S. manufacturing sector had a compound annual rate of growth of 1.3%, while Canadian manufacturing saw annual growth of 0.9%. The cumulative effect of this 0.4% difference over more than 30 years could have had significant impact on the two countries' economic growth.

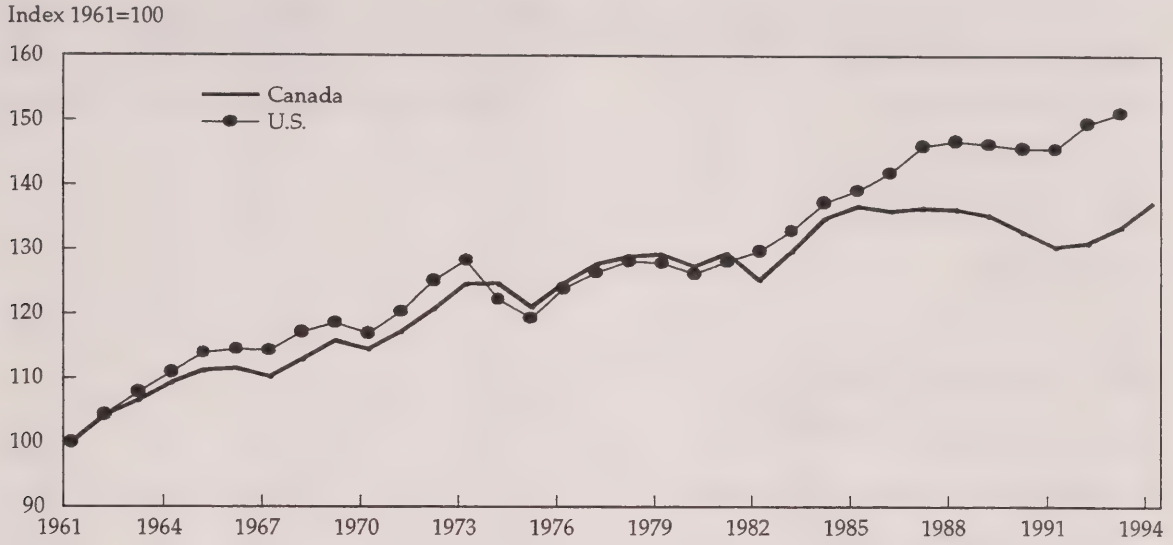
Between 1961 and 1985 the Canadian and U.S. multifactor productivity indexes were never greater than 5.0 points apart, with an average differential of 1.4. Figure 9 shows that during this period, the indexes grew at much the same rate in each country (1.3% in Canada and 1.4% in the United States).

However, after 1985 Canadian manufacturing lost ground. The difference between the Canadian and U.S. indexes was always greater than 5.0 points, with an average differential of 12.6 points. Canadian manufacturing's productivity declined an average 0.3% each year, while the U.S. index continued to rise at an average 1.0% per annum. The decline in Canadian manufacturing productivity after 1985 explains almost entirely the lower growth rate observed over the entire 1961-1993 period. However, the gap in the manufacturing indices grew from 1985 to 1992, but was slightly narrower in 1993.

3. Starting with section 3.3, "productivity" refers to MFP based on the concept of intra-industry indexes. This measure is used because this is the only official MFP measure available for U.S. manufacturing. In order to make comparisons between Canada and the U.S., the Canadian measures must be recalculated based upon intra-industry indexes. For the purposes of comparability, the forestry industry had to be added to total manufacturing in Canada in order to be consistent with the U.S. definition. The 15 comparable industries represent approximately 90% of manufacturing output in both countries.

Figure 9

After deteriorating from 1985 to 1992, the productivity gap between the Canadian and American manufacturers slightly improved in 1993



3.4 - Relative performance of individual industries

Between 1961 and 1985, Canadian manufacturers had higher rates of productivity growth in 10 of 15 industries, but after that year U.S. manufacturers enjoyed higher productivity growth in all 15 industries.

In the 10 industries where Canada had higher rates of growth during the first period, the gap between Canada and the United States was 0.6% on average. But from 1985 to 1992 the United States was ahead by an average gap of 1.3%. As well, the two largest gaps in Canada's favour between 1961 and 1985 were in printing and publishing (0.9%) and wood products (0.8%). After 1985, the two largest gaps in favour of the U.S. are much more significant. They are in machinery, electrical and electronic products (3.2%), and paper and allied products (2.1%).

When the entire period from 1961 to 1992 is considered as a single unit, the annual growth rate of productivity in 7 of the 15 industries in this comparison was greater in Canada. The United States had higher growth rates in 6 of the remaining industries, while growth was equal in leather and allied products and textile and textile products. Despite this split U.S. manufacturers realized higher overall productivity gains in the manufacturing sector compared with Canadian manufacturers.

The difference in productivity growth rates over the entire period from 1961 to 1992 can largely be attributed to the superior performance of the machinery and electrical and electronic products industries[4] in the United States. During this period, this industry was relatively more important in the United States than in Canada, accounting for 13.5% of manufacturing gross output compared with 9.1% in Canada. Second, productivity in this industry grew over the period at 2.6% per year in the United States, compared with 1.2% in Canada. Productivity in this industry led by a narrow margin in the U.S. in the 1960s and 1970s, and then pulled farther ahead in the 1980s. In short, this industry had a much more important role in the manufacturing industry in the United States, and enjoyed much greater productivity growth.

4. This has to be qualified by the difficulties of deflating computer equipment which could potentially introduce a bias in the results. In top of computer equipment, this industry includes a wide variety of products such as agricultural implements and telecommunications equipment.

Table 4 - Productivity growth rates between Canada and the United States for comparable manufacturing industries

	1961-1992		1961-1985		1985-1992	
	Canada	U.S.	Canada	U.S.	Canada	U.S.
Manufacturing industries total	0.9	1.3	1.3	1.4	-0.6	1.0
Food & beverage industries	0.3	0.8	0.6	0.9	-0.5	0.4
Plastic & rubber product industries	1.1	1.0	1.7	1.1	-0.9	0.7
Leather & allied product industries	0.7	0.7	1.2	0.5	-0.7	1.2
Textile & textile product industries	1.8	1.8	2.4	2.0	-0.3	1.2
Clothing industries	0.8	1.2	1.1	1.3	-0.2	1.0
Wood & lumber industries	1.6	1.2	2.1	1.3	0.1	0.9
Furniture & fixture industries	0.2	0.5	0.7	0.8	-1.4	-0.2
Paper & allied product industries	-0.2	0.8	0.2	0.9	-1.5	0.6
Printing publishing & allied products	0.1	-0.3	1.0	0.1	-3.0	-1.4
Primary metal industries	0.6	0.1	0.7	0.0	0.1	0.4
Machinery, electrical & electronic products ind.	1.2	2.6	1.5	2.3	0.3	3.5
Transportation equipment industries	1.2	0.8	1.7	1.1	-0.6	-0.2
Non-metallic mineral product industries	0.4	0.5	0.8	0.4	-1.3	0.8
Refined petroleum & coal product industries	0.6	0.3	0.8	0.2	0.0	0.5
Chemical & chemical product industries	1.2	1.1	1.5	1.1	0.0	0.8

Table 5 - Since 1985, productivity growth in the United States is greater for every comparable manufacturing industries

	1961-1992	1961-1985	1985-1992
Manufacturing industries total	U.S.	U.S.	U.S.
Food & beverage industries	U.S.	U.S.	U.S.
Plastic & rubber product industries	Can.	Can.	U.S.
Leather & allied product industries	SAME	Can.	U.S.
Textile & textile product industries	SAME	Can.	U.S.
Clothing industries	U.S.	U.S.	U.S.
Wood & lumber industries	Can.	Can.	U.S.
Furniture & fixture industries	U.S.	U.S.	U.S.
Paper & allied product industries	U.S.	U.S.	U.S.
Printing publishing & allied products	Can.	Can.	U.S.
Primary metal industries	Can.	Can.	U.S.
Machinery, electrical & electronic products	U.S.	U.S.	U.S.
Transportation equipment industries	Can.	Can.	U.S.
Non-metallic mineral product industries	U.S.	Can.	U.S.
Refined petroleum & coal product industries	Can.	Can	U.S.
Chemical & chemical product industries	Can.	Can	U.S.

Figures 10 and 11 also shed some light on the contribution[5] of each industry to the growth in productivity in all manufacturing industries. In the United States, machinery, electrical and electronic products had the greatest influence on the growth rate of productivity for the entire manufacturing industry. Its contribution is almost four times as large as that of the food and beverage industry, the next most significant contributor. In Canada, the contributions of each industry are more evenly distributed. In fact, the three largest contributors to Canadian manufacturing productivity growth are almost equal to the single largest U.S. contributor.

5. The contribution of each industry is calculated as the nominal value of gross output net of intra-industry sales of that industry divided by the nominal value of gross output net of intra-industry sales for the entire manufacturing sector, then multiplied by the growth rate of productivity for that industry from 1961 to 1992.

Figure 10

Average annual contribution of Canadian manufacturing industries to the growth of total manufacturing productivity, 1961-1992

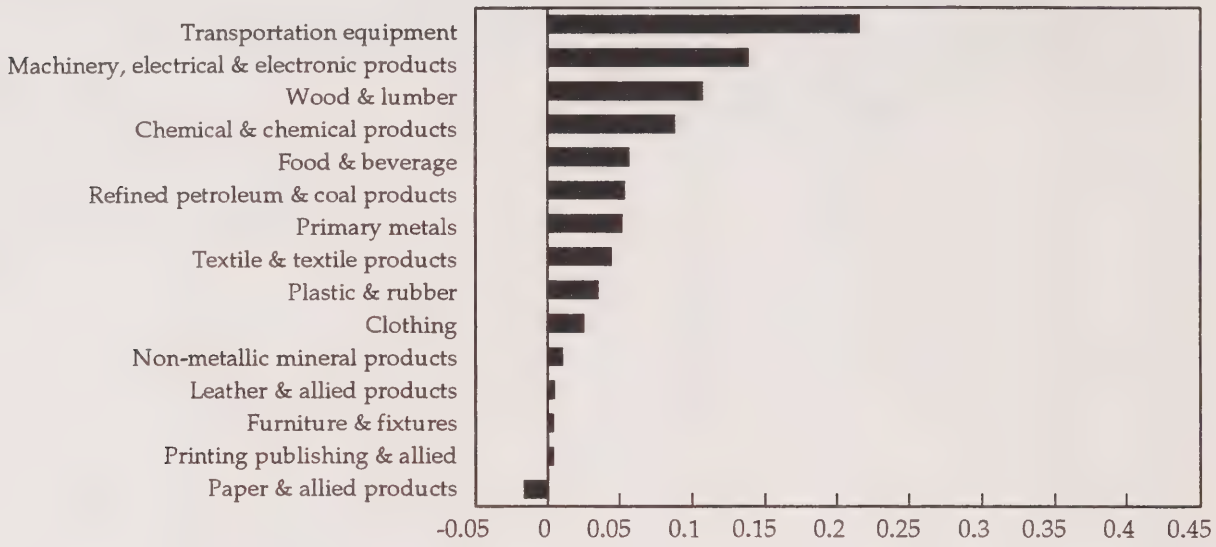
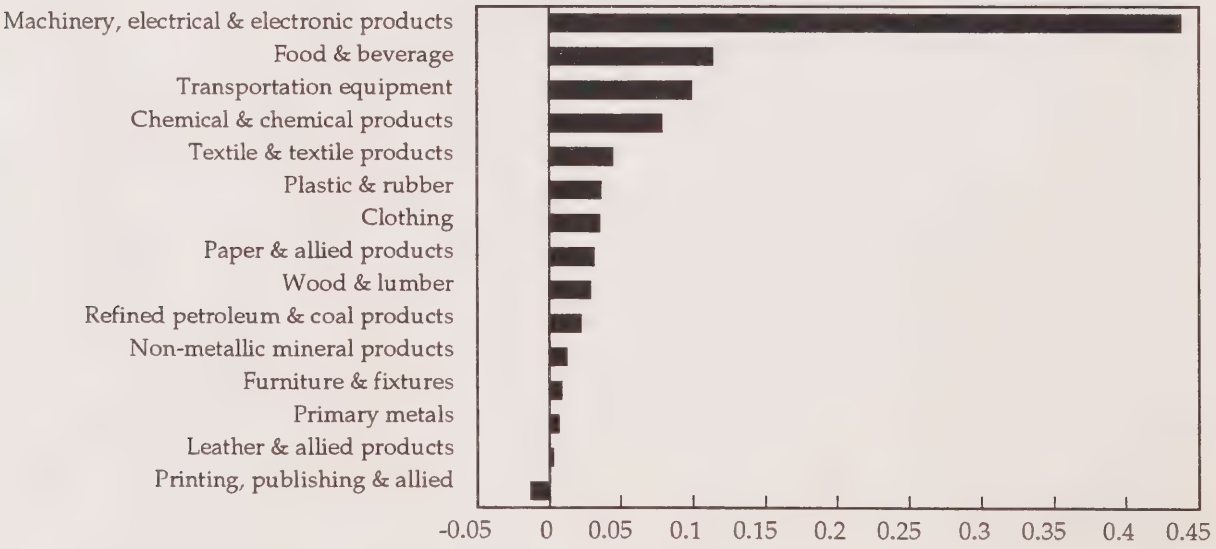


Figure 11

Average annual contribution of U.S. manufacturing industries to the growth of total manufacturing productivity, 1961-1992



FEATURE ARTICLE

Methodology used to Produce Advance Estimates of Multifactor Productivity Indexes for the Canadian Aggregate Business Sector

by
Mesfin Mirotchie[1]

1 - Introduction

The purpose of this paper is to explain the methodology used to compute advance estimates of the Canadian business sector aggregate multifactor productivity (MFP) indexes for recent past years[2]. The methodology uses aggregate proxy variables with incomplete information. The paper discusses how the proxies are calculated and how well they approximate the actual variables over the historical record. The discussion is organised under three sections. Section two identifies multifactor productivity variables, two equations - one that is used to compute historical MFP indexes with complete information and one that is used to generate advance MFP estimates with proxy variables - and indicates the reasons for implementing the proxy approach. Section three explains the compilation of the proxy variables with an emphasis on three points: (a) data sources and adjustments to the data, (b) the mechanics of the estimation of the past and extrapolation of advance estimates, and (c) the tabular and graphical analysis of the results generated with the proxy model. The last section demonstrates how the projected estimates are applied to compute advance aggregate MFP indexes for the most recent years.

1. The author wishes to thank René Durand for his valuable comments at various stages of this paper and J.P. Maynard for his inputs at the early stages of the paper. However, the author assumes full responsibility for the paper.

2. The term "advance" is used in this paper to describe the projection of MFP indexes over the recent past (but not the future) years for which complete information is not available. For example, the 1992 input-output tables which contain complete historical information are published in 1995 with a three-year lag. Therefore, the advance estimation with proxies is done in 1995 for the two recent past years, namely, 1993 and 1994.

2 - The Need for Advance Estimation

The need for advance estimation by proxies is predicated primarily by a necessity to produce timely multifactor productivity estimates. This by itself is the outcome of the unavailability of timely detailed economic data for the most recent past years for which the productivity estimates are required.

At the aggregate business sector level, multifactor productivity growth, τ, is computed as the difference between the rate of growth in real value-added (or real GDP), $\dot{y}$, and the weighted rates of growth of labour, $\dot{L}$, and capital, $\dot{K}$, inputs by industry[3]. In a mathematical short hand, the relationship is often expressed as:

$$\tau = \dot{y} - (\omega_L^T \dot{L} + \omega_K^T \dot{K}) \qquad (1)$$

where ω_L and ω_K are vectors of the cost shares of L and K inputs, respectively, valued in current prices[4]. Labour input is measured in terms of hours worked and capital is measured in terms of the real net end-of-previous-year capital stock.

Over the historical record, the variables $\dot{y}$, $\omega_L^T \dot{L}$ and $\omega_K^T \dot{K}$ are computed as chained Törnqvist[5] indices from detailed information at the disaggregated industry level. Such information is not

3. At its most detailed level of the MFP estimation, the aggregate Canadian business sector contains 122 industries.

4. Note that vectors and matrices are bold. The superscript T indicates the transpose of matrices and vectors and the dot symbol over the variables indicates temporal growth rates.

5. The chained Törnqvist index is a discrete time approximation in which logarithmic changes are weighted by arithmetic averages of the shares over the current and the previous year.

available for the few most recent past years. Scalar proxies, y, L and K, are therefore needed for the indexes of aggregate real GDP and labour and capital inputs, respectively. The corresponding aggregate factor shares, s_L and s_K, are available for the most recent past years and do not need to be approximated. The approximation equation is given by:

$$\tau = \dot{y} - (s_L\dot{L} + s_K\dot{K}) \qquad (2)$$

where the variables are as defined previously.

3 - Compilation and Estimation of the Proxies

The Productivity Accounts are closely linked to the Input-Output Accounts, which, generally, are produced with a lag of about three years relative to the current calendar year. The Productivity accounts also rely on detailed estimates of hours worked and capital stock data reconciled with the concepts and methods of National Accounts. In particular, the data are classified uniformly according to the current industrial classification while some source data are not. In addition, the estimates are produced according to the sectoral breakdown of the accounts into business and non business activities. Since the Productivity Accounts pertain only to the business sector, hours worked and capital stock data have to be estimated for that sector before productivity estimates are derived.

These adjustments can not be made for the recent past years since the adjustments are based on reconciled information contained in the input-output tables. Moreover, aggregate capital stock estimates are produced with the Törnqvist index formula which makes use of detailed industry weights (chained over time) that are not available for the recent past years. The unavailability of the requisite information necessitates the development of proxy capital stock data on the basis of (unchained) Laspeyres index formula by summing constant price estimates for each industry.

Both real and nominal GDP data are adjusted similarly. The data are further adjusted by excluding two industries: Royalties on Natural Resources and Owner-Occupied Dwellings, since the two industries are excluded from the benchmark estimates of both labour and multifactor productivity indexes [Table 1]. In addition, nominal GDP data at factor cost are adjusted by adding the value of Other Indirect Taxes which are considered to be part of the gross income accruing to capital. The adjusted nominal GDP is used to compute the factor income shares for labour and capital inputs, whereas, the adjusted real GDP is the proxy used to project the Törnqvist index of real GDP. The basic data for this variable are derived by Laspeyres index formula.

Finally, the labour hours worked data are summed over several industries without adjusting for labour quality differences[6].

The data for the proxy variables are derived from a combination of two broadly defined sources. First, aggregate proxy (nominal and real) GDP data are compiled from the Canadian System of National Accounts, and, second, data on aggregate proxy variables for capital stock and labour are compiled from the subject matter divisions within Statistics Canada. Once the data are compiled, they undergo several adjustments that are summarized in Table 1.

Capital stock data come from Investment and Capital Stock (ICS) Division. The aggregate business sector nominal GDP estimates in current prices and the associated aggregate factor income shares are taken from the *Income and Expenditure Accounts* (Catalogue 13-201 Annual) from the National Accounts and Environment (NAE) Division. The real GDP estimates are taken from the monthly estimates of gross domestic product at factor cost published by the Industry Measures and Analysis (IMA) Division in the *Gross Domestic Product by Industry*, (Catalogue 15-001 Monthly). Labour data are taken from the Labour Productivity Accounts of the Input-Output Division. At the aggregate business sector level, hours worked in the Labour Productivity Accounts consist of hours worked

6. Normally, over the historical benchmark years, differences in labour quality are adjusted by weighting hours worked by the relative proportions of labour compensation as in equation (1).

Table 1 - Summary of Proxy Data Sources and Adjustments

Variable	Source	Adjustments
Capital Stock	ICS Division	Exclude Non-business Sector Data
Real GDP at Factor Cost	IMA Division	Less Imputed Rent Less Royalties
Nominal GDP at Factor Cost	NAE Division	Add Other Indirect Taxes Less Imputed Rent Less Royalties
Labour (Total Hours Worked)	Productivity Accounts	No Adjustments

by the civilian population regularly surveyed through the *Labour Force Survey* (Catalogue 71-001 Monthly).

3.1 - Graphical Analysis of the Actual and Proxy Variables

A graphical evaluation of the proxy variables vis-à-vis the actual variables helps one to see how good are the proxies as substitutes for the actual variables. Figures 1 to 3 compare the similarities and differences between the actual and proxy data series. The proxy data series span a total of 33 years from 1962-1994, whereas, the actual data series go only through to 1992. As such, the comparison of the series is meaningful only within the time periods covered by the actual data series. The proxies reflect the likely direction of growth of the actual historical series extended over the most recent past years.

Figure 1 compares historical growth rates in actual and proxy real GDP values. Figure 2 exhibits growth rates of proxy hours worked with the actual total hours worked over the historical time period. Similarly, Figure 3 contrasts historical rates of growth in the proxy aggregate capital stock with the growth rates of actual capital stock series. As can be seen, the first two figures clearly demonstrate that the differences between the proxy and the actual variables are minimal and the proxies are likely to perform satisfactorily as the projectors of the actual variables.

However, the same level of confidence may not be attributed to the capital proxy variable. As depicted in Figure 3, for the most part, the proxy capital variable appears to underestimate the rate of growth in the realised capital stock variable over the historical period. To the extent that this is a systematic pattern, it may be corrected as will be shown later. But one thing to note is that the temporal movement of the actual and proxy capital variables is in the same direction although the growth rates do not appear to be as highly transparent as in the two previous cases. Unlike the series for the other two variables, however, the turning points and, at times, the direction of change of the capital stock series do not appear as tightly synchronised over the historical period.

The projection model which is discussed next will indicate the level of bias and the degree of precision with which each of the proxy variable approximates the corresponding actual variable. The precision cannot be improved but the bias may be eliminated through a linear correction using the results of the simple linear regression.

3.2 - Econometric Estimation of the Precision and Bias of the Proxies

Once the task of collecting and adjusting the data for the proxy variables is completed, the next step is to make advance estimates based on the proxies. For this, an econometric technique is used to estimate the following equation with the proxies.

$$A_t = \alpha_0 + \alpha_1 P_t + \beta_1 d_1 + \beta_2 d_2 + u_t \qquad (3)$$

where A_t and P_t represent any one of the actual and corresponding proxy variables, receptively, for year t, the d's are dummy variables taking successively a value of one for projection years 1 and 2 and zero otherwise, and u_t is the regression residual; and α_0 and α_1 are the intercept and slope estimators, respectively. The β's are the dummy variable parameters providing the pro-

Figure 1 - Comparison of Proxy and Actual Measures of GDP Growth Rates

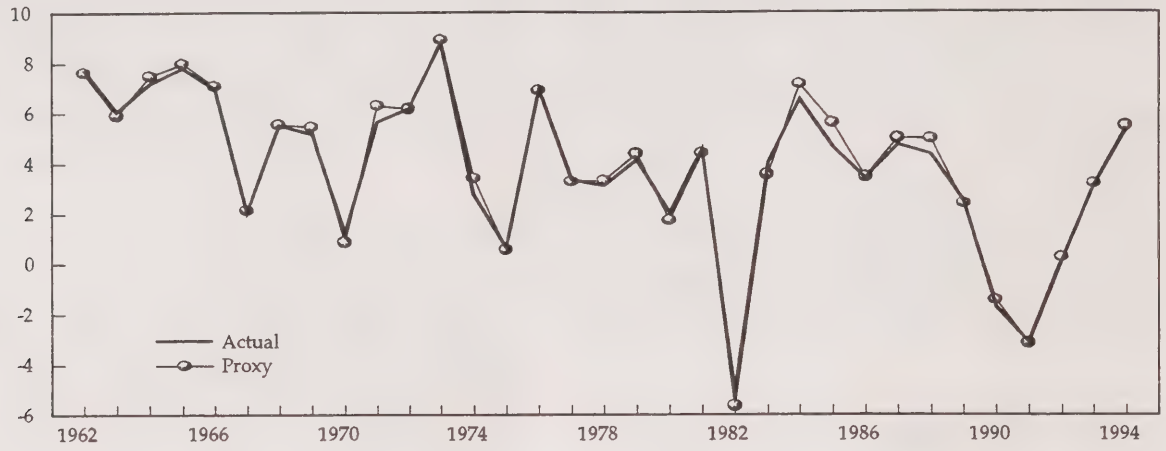


Figure 2 - Comparison of Proxy and Actual Labour Hours Worked Growth Rates

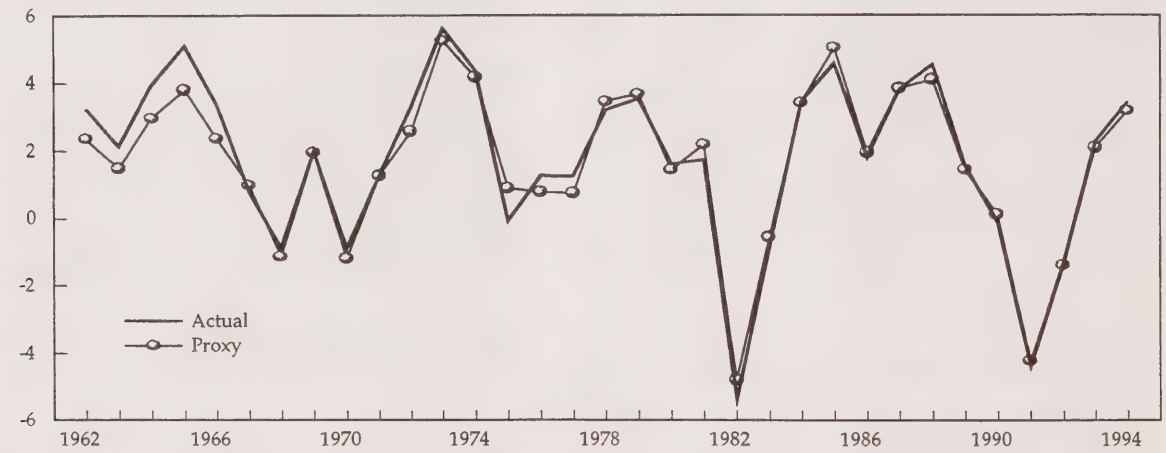
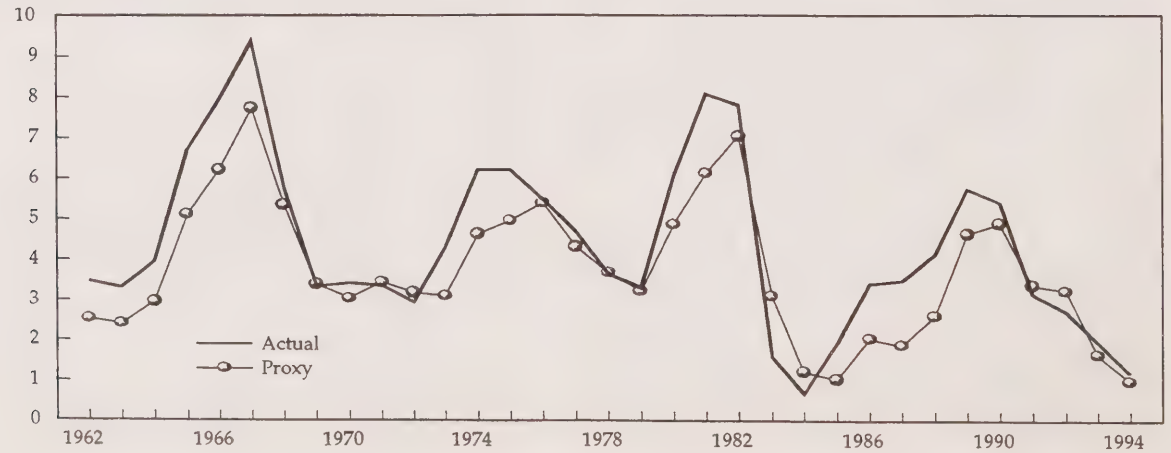


Figure 3 - Comparison of Proxy and Actual Capital Stock Growth Rates

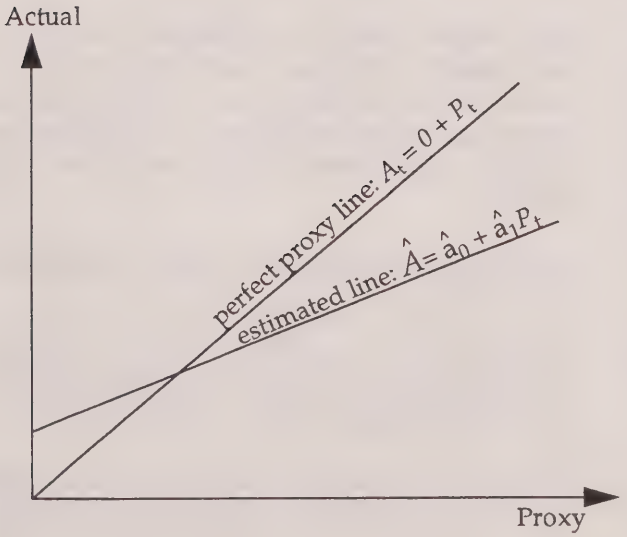


jected growth rates of the actual variables. That is, setting A_t equal to zero over the recent years and solving for the coefficients of the dummy variables produces the projected growth rates.

The estimation of equation (3) complements the graphical analysis of the previous section and generates quantitative tools to assess how well the proxies approximate the actual variables. The assessment of the econometric results is important for two reasons. First, it will indicate the accuracy of the proxies which is transparent to the reliability of the advance estimates. Second, the proxies may have a systematic bias that must be corrected leaving only the non-systematic component of the error term. Both of the above reasons for the assessment of the econometric results are illustrated in Figure 4.

Proxies that do not contain a systematic bias will generate a 45 degree line with a perfect fit. Even if the proxies contain a systematic bias that is non-degrading to the estimated parameters, the regression line will still be close to the perfect proxy line indicated by $A_t = 0 + P_t$. However, if there is a systematic and degrading bias, the regression line lies further away from the perfect fit line and the gap between the two lines depends on the level of bias.

Figure 4 - A conceptual illustration of accuracy and bias in proxy variables



Unless corrected, the bias can damage the ability of the proxies to generate reliable advance estimates. Because of the possibility of the presence of such bias, the performance of the proxies is scrutinised over the entire historical period (1962-1994 in the present case) using Theil's linear correction model[7]. The model is constructed in such a way that logarithmic changes in the actual variables, A, are regressed on the logarithmic changes in the corresponding proxies, P. The model generates key statistical parameters of interest including an intercept, a slope, standard errors of the estimated parameters, and corrected multiple determination coefficient, $\overline{R}^2$.

The proxies are unbiased predictors of the actual variables if the estimated intercept and slope parameters are not statistically different from zero and one, respectively, as depicted by the 45° line on the above figure. Proxies are reliable indicators of the actual variables if the proportion of the variation in the actual variables explained by the variations in the proxies (i.e., $\overline{R}^2$) is close to 100%. Generally, however, econometric estimates show a departure from the line of perfect fit. For instance, if the actual variable is growing 90% as fast, on average, as the proxy, then the slope parameter of the regression line will be 0.9. The observed bias may be corrected by reducing the rate of growth of the proxy by 10%. The correction for the bias is made on both the slope and the intercept parameters. On the other hand, the precision of the parameters is determined by the relative size of the standard error corresponding to each parameter estimate and it cannot be improved.

In addition to the above actual and proxy variables, two dummy variables, one for each year for which realised data are not available for the Törnqvist variables, are added to the explanatory variables of the model.

4 - Estimates and Forecasts of the Variables

The empirical results of the regression analysis, based on 33 time series observations from 1962-

7. Theil, H., *Applied Economic Forecasting*, Chicago: Rand McNally and Company, Armsterdam: North-Holland Publishing Company, 1966.

1994, are summarised in Table 2. Among other statistics of interest, the regression results consist of both historical and forecast growth rates for the three dependent variables, namely, real GDP, total hours worked, and net aggregate capital stock. The variables are expressed in logarithmic changes.

As can be seen from Table 2, the estimated model parameters meet almost all of the test conditions discussed previously. The intercept parameters are not significantly different from zero and the estimated slope parameters are not significantly different from unity except for the output variable at the 5% level of significance. Also, the models, especially for the real GDP and total hours worked, have a high $\overline{R}^2$; thus, have a high goodness of fit. It can be concluded that the proxies are unbiased and fairly precise predictors of the actual variables; although a slight slope correction seems appropriate in the case of the capital stock. Also, as indicated by the size of the $\overline{R}^2$ statistic, the amount of variation explained by the capital stock model is low relative to the other two models.

The scatter diagrams in figures 5 to 7 below further describe the relationship between the actual values of the variables and their proxies. In these figures the pairs of observations are represented by spherical dots and the regression (fitted) results are indicated by a solid line.

The essential point to be noted from these figures is the movement of the observed (actual) series relative to the movement of the fitted proxy series. As the figures indicate, the fitted regression series are close to the 45° line and the observed series are narrowly dispersed around that line. Nevertheless, the dispersion of the observations around the regression line "drifts" away steadily in figures 6 and 7 relative to figure 5. This reflects the higher precision or $\overline{R}^2$ of the regression for the real GDP variable, followed by hours worked and net aggregate capital stock variables.

Table 2 - Proxy Model Regression Results

Actual Depend Variables	Independent Variables	Parameter Estimators	Parameter Estimates	Std Error	Adjtd. $\overline{R}^2$	95% Confidence Intervals Lower	Upper
GDP	Constant	α_0	0.05	0.083	0.991	-0.11	0.22
	Proxy GDP	α_1	0.96	0.017		0.92	0.99
	$dummy_{1993}$	β_1	3.04	0.304		2.41	3.66
	$dummy_{1994}$	β_2	5.16	0.305		4.53	5.78
Hours	Constant	α_0	0.04	0.104	0.963	-0.16	0.26
	Proxy Hours	α_1	1.06	0.037		0.99	1.14
	$dummy_{1993}$	β_1	2.23	0.490		1.23	3.24
	$dummy_{1994}$	β_2	3.37	0.493		2.36	4.38
Capital	Constant	α_0	0.04	0.369	0.876	-0.71	0.80
	Proxy Capital	α_1	1.16	0.090		0.97	1.34
	$dummy_{1993}$	β_1	1.93	0.802		0.29	3.57
	$dummy_{1994}$	β_2	1.17	0.819		-0.50	2.85

4.1 - Projections of the Aggregate MFP Indexes

The projected growth rate of the real gross domestic product of the business sector for 1993 and 1994 are respectively of 2.92% and 4.97%.

These rates of growth in real GDP are closely related to the changes in the projected growth

Figure 5 -Observed and fitted real GDP growth rate series

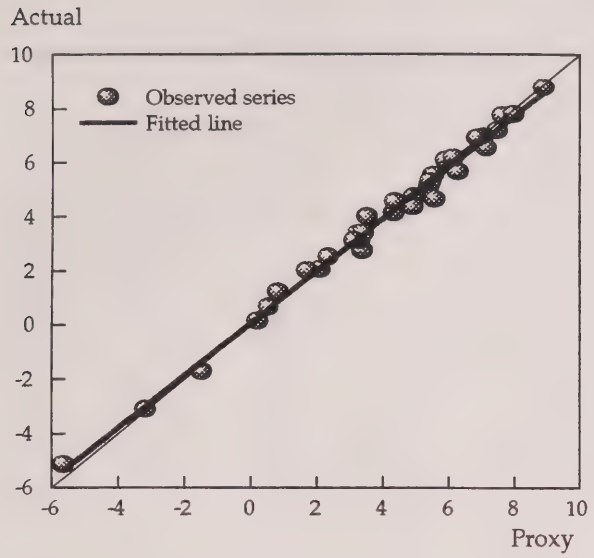
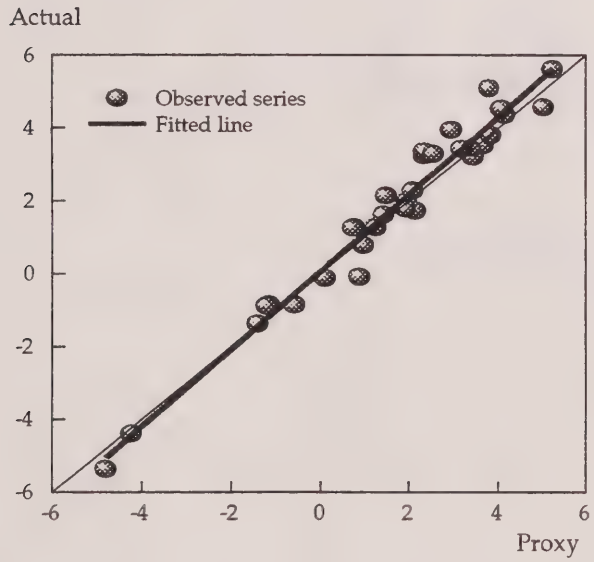


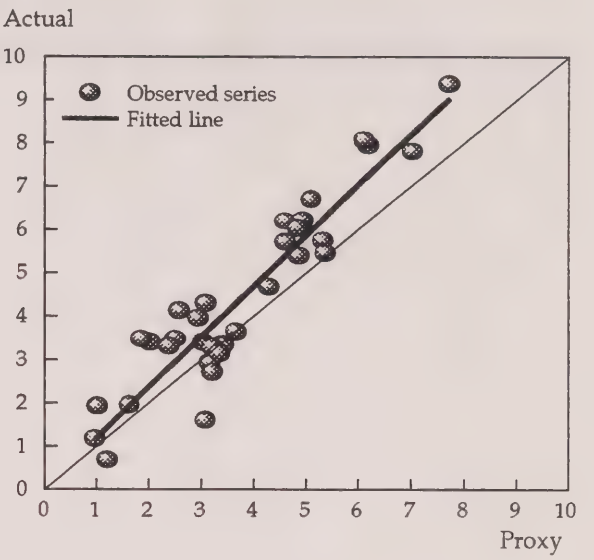
Figure 6 -Observed and fitted labour hours worked growth rate series



rates of labour and capital inputs. The projected rate of growth in the total hours worked are 2.23% and 3.37% in 1993 and 1994 respectively. The net capital stock is projected to increase at a rate of 1.93% and 1.17% over the same period.

The projected growth rates, are now available for the calculation of the aggregate multifactor productivity estimates. To do this, the relationship captured in equation (2) is applied with the projected variables. For example, for 1993, the combination of the projected rates of growth in real gross domestic product, total hours worked and capital stock with the labour share of 0.71 and the capital share of 0.29, the aggregate factor productivity estimate is:

Figure 7 - Observed and fitted capital stock growth rate series



$$\tau_{1993} = 2.92 - 0.71*2.23 - 0.29*1.93 = 0.79 \quad (4)$$

The above result in Equation (4) provides an advance estimate of 0.79% increase in the aggregate multifactor productivity of the Canadian business sector in 1993 relative to the 1992 production period. A similar calculation gives the projected productivity gain of 2.28% for 1994.

PART 1

Multifactor Productivity

Experimental Data

Table 1 - Business sector - Törnqvist indices of multifactor productivity based on real value-added and related data (1986=100)

Year	Gross domestic product	Labour input	Capital input	Combined inputs	Multifactor productivity	Implicit prices			
						Output	Combined input	Labour	Capital
1974	69.1	85.6	59.8	75.7	91.7	44.6	40.9	35.9	51.6
1975	69.5	85.6	63.5	77.2	90.4	50.3	45.4	41.3	53.9
1976	74.4	86.6	67.0	79.3	94.1	53.5	50.3	47.0	56.7
1977	76.8	87.7	70.2	81.2	94.9	56.7	53.8	51.5	58.0
1978	79.2	90.5	72.7	83.9	94.6	61.0	57.7	54.3	64.3
1979	82.5	93.7	75.1	86.8	95.3	68.0	64.7	59.2	76.1
1980	84.1	95.2	79.6	89.6	94.2	75.2	70.8	65.9	80.6
1981	88.0	96.8	86.1	93.1	94.7	80.6	76.4	74.7	79.2
1982	83.4	91.6	92.8	92.1	90.7	86.8	78.7	82.7	71.2
1983	86.8	90.8	94.3	92.0	94.3	91.0	85.7	87.1	83.4
1984	92.4	94.0	94.9	94.3	98.0	94.7	92.8	91.5	95.3
1985	96.7	98.2	96.7	97.7	99.0	97.6	96.6	95.3	99.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.7	103.8	103.5	103.7	101.0	105.0	106.1	106.0	106.3
1988	109.3	108.5	107.7	108.2	101.0	110.6	111.7	112.1	110.7
1989	112.0	110.2	113.9	111.5	100.4	114.6	115.1	119.4	107.4
1990	110.1	110.1	120.0	113.3	97.0	118.2	114.7	124.7	97.4
1991	106.6	105.2	123.8	110.9	95.8	120.7	115.6	132.1	88.5
1992	106.8	103.8	127.2	110.7	95.9	121.4	116.5	136.1	84.9
1993	110.1	106.1	129.6	113.1	96.8	121.7	117.9	135.9	88.5
1994	115.9	109.8	131.2	116.2	99.2	123.4	122.5	137.7	97.5

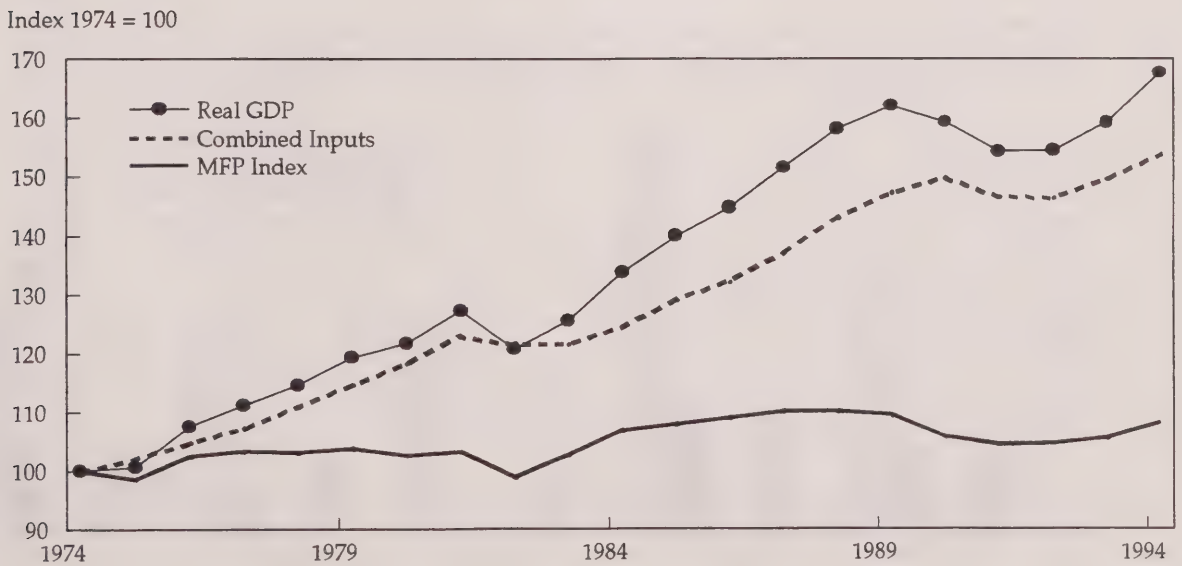


Table 2 - Breakdown of annual growth in real value added, business sector industries

Year	(1) Hours worked	(2) Labour share	(3) Labour contribution	(4) Capital service	(5) Capital share	(6) Capital contribution	(7) Multifactor productivity	(8) Gross domestic product	(9) Capital/labour ratio
	Δ %	%	Δ % (1 × 2)	Δ %	%	Δ % (4 × 5)	Δ %	Δ % (3 + 6 + 7)	Δ % (4-1)
1974	4.4	65.1	2.8	6.2	34.9	2.2	-2.2	2.7	1.8
1975	-0.1	65.4	-0.1	6.2	34.6	2.1	-1.5	0.6	6.3
1976	1.3	66.2	0.8	5.5	33.8	1.8	4.0	6.9	4.1
1977	1.2	67.0	0.8	4.7	33.0	1.5	0.9	3.3	3.4
1978	3.2	66.8	2.1	3.6	33.2	1.2	-0.2	3.1	0.4
1979	3.5	65.3	2.3	3.3	34.7	1.1	0.7	4.1	-0.2
1980	1.6	64.5	1.0	6.0	35.5	2.1	-1.1	2.0	4.4
1981	1.7	65.5	1.1	8.1	34.5	2.8	0.6	4.5	6.2
1982	-5.4	67.3	-3.6	7.8	32.7	2.6	-4.3	-5.1	13.9
1983	-0.9	66.7	-0.6	1.6	33.3	0.5	3.9	4.0	2.5
1984	3.4	64.6	2.2	0.7	35.4	0.2	4.0	6.5	-2.7
1985	4.6	64.2	2.9	1.9	35.8	0.7	1.0	4.6	-2.5
1986	1.8	64.8	1.2	3.4	35.2	1.2	1.0	3.4	1.6
1987	3.8	65.1	2.5	3.5	34.9	1.2	1.0	4.7	-0.3
1988	4.5	65.3	3.0	4.1	34.7	1.4	0.0	4.4	-0.4
1989	1.6	66.1	1.0	5.7	33.9	1.9	-0.5	2.5	4.1
1990	-0.1	67.7	-0.1	5.4	32.3	1.7	-3.4	-1.7	5.5
1991	-4.4	69.5	-3.1	3.1	30.5	1.0	-1.2	-3.1	7.9
1992	-1.4	70.6	-1.0	2.7	29.4	0.8	0.2	0.1	4.1
1993	2.3	70.5	1.6	1.9	29.5	0.6	0.9	3.1	-0.3
1994	3.4	69.4	2.4	1.2	30.6	0.4	2.5	5.3	-2.2

Table 3 - Manufacturing industries - Törnqvist indices of multifactor productivity based on real value-added and related data (1986=100)

Year	Gross domestic product	Labour input	Capital input	Combined inputs	Multifactor productivity	Implicit prices			
						Output	Combined input	Labour	Capital
1974	78.3	102.7	77.9	88.7	83.1	43.8	36.1	33.7	43.2
1975	72.7	99.0	81.5	89.6	78.0	49.9	38.8	38.7	40.0
1976	78.4	99.6	82.9	90.5	83.2	51.8	43.3	44.1	41.3
1977	81.8	98.5	82.8	91.4	87.5	54.4	47.8	48.5	46.3
1978	85.5	101.9	83.2	92.3	89.3	58.9	52.4	52.2	54.0
1979	87.5	104.5	83.4	93.2	89.8	67.4	60.2	57.6	68.1
1980	84.8	104.0	85.6	94.2	86.6	74.8	64.6	63.6	68.0
1981	89.8	102.7	93.1	95.1	90.0	79.1	71.7	73.3	67.7
1982	79.6	93.8	99.7	96.1	83.1	83.8	72.8	81.0	49.1
1983	85.8	92.6	100.6	97.0	90.0	87.7	81.5	86.3	65.7
1984	95.2	96.4	97.8	98.0	98.3	91.3	89.7	90.4	88.6
1985	99.6	98.5	97.3	99.0	101.6	94.4	95.2	95.5	96.7
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.8	103.4	105.3	101.0	100.7	103.9	103.6	103.5	106.9
1988	109.6	108.1	111.4	102.0	100.3	111.3	109.4	108.1	118.2
1989	110.5	108.5	118.3	103.0	98.6	113.8	110.4	112.3	112.7
1990	105.3	102.9	127.1	104.1	94.7	115.5	109.7	118.4	95.2
1991	97.7	95.5	131.4	105.1	91.1	116.4	109.9	125.5	77.7
1992	97.8	93.7	132.4	106.2	92.0	116.1	112.1	128.6	75.7
1993	102.3	95.8	129.4	107.3	95.6	N/A	N/A	N/A	N/A
1994	109.1	98.4	125.2	108.3	101.4	N/A	N/A	N/A	N/A

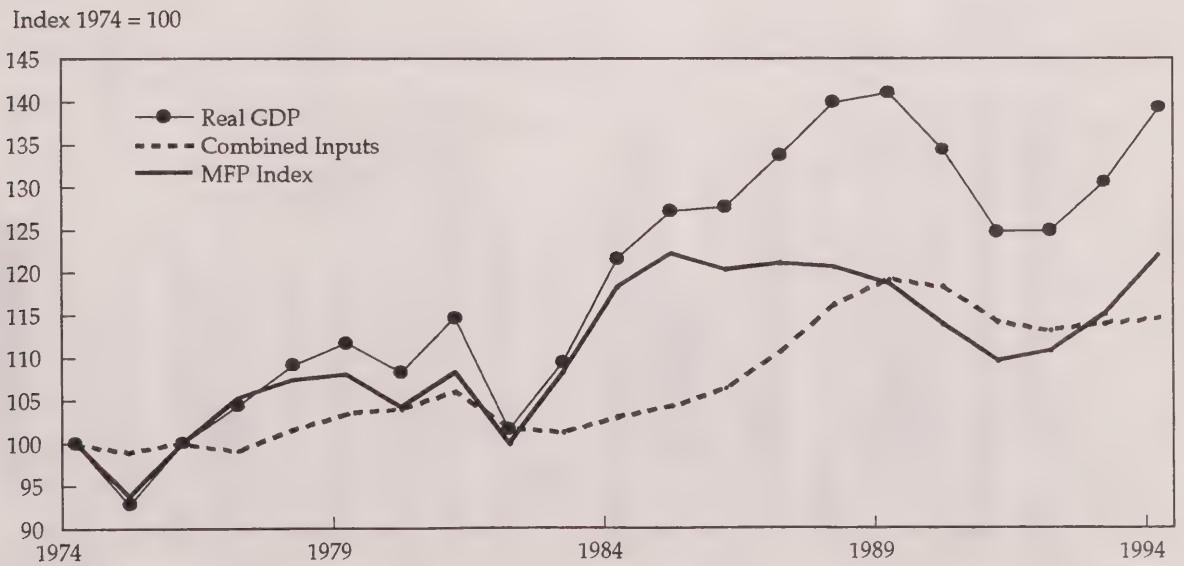


Table 4 - Breakdown of annual growth in real value added, manufacturing industries

Year	(1) Hours worked	(2) Labour share	(3) Labour contribution	(4) Capital service	(5) Capital share	(6) Capital contribution	(7) Multifactor productivity	(8) Gross domestic product	(9) Capital/labour ratio
	Δ %	%	Δ % (1 × 2)	Δ %	%	Δ % (4 × 5)	Δ %	Δ % (3 + 6 + 7)	Δ % (4-1)
1974	1.8	67.9	1.2	3.6	32.1	1.1	0.3	2.6	1.8
1975	-3.6	66.9	-2.4	4.6	33.1	1.5	-6.1	-7.2	8.5
1976	0.6	67.8	0.4	1.8	32.2	0.6	6.7	7.8	1.2
1977	-1.1	67.3	-0.8	-0.2	32.7	-0.1	5.2	4.3	0.9
1978	3.4	66.7	2.3	0.5	33.3	0.2	2.0	4.5	-2.9
1979	2.6	67.5	1.7	0.2	32.5	0.1	0.6	2.4	-2.3
1980	-0.5	67.2	-0.4	2.7	32.8	0.9	-3.5	-3.1	3.2
1981	-1.2	67.6	-0.8	8.8	32.4	2.8	3.9	5.9	10.1
1982	-8.7	67.6	-5.9	7.1	32.4	2.3	-7.7	-11.4	17.3
1983	-1.2	68.9	-0.8	1.0	31.1	0.3	8.4	7.8	2.3
1984	4.1	67.2	2.7	-2.8	32.8	-0.9	9.2	11.1	-6.6
1985	2.2	65.9	1.4	-0.5	34.1	-0.2	3.3	4.6	-2.6
1986	1.5	68.2	1.1	2.7	31.8	0.9	-1.5	0.4	1.2
1987	3.4	65.8	2.2	5.3	34.2	1.8	0.7	4.8	1.9
1988	4.6	63.3	2.9	5.8	36.7	2.1	-0.4	4.6	1.1
1989	0.4	62.5	0.2	6.2	37.5	2.3	-1.6	0.8	5.8
1990	-5.2	62.9	-3.3	7.5	37.1	2.8	-4.0	-4.7	13.3
1991	-7.1	63.4	-4.5	3.3	36.6	1.2	-3.8	-7.2	11.3
1992	-1.9	64.2	-1.2	0.8	35.8	0.3	1.0	0.0	2.8
1993	2.3	64.8	1.5	-2.3	35.2	-0.8	3.9	4.6	-4.5
1994	2.7	64.8	1.7	-3.2	35.2	-1.1	6.1	6.7	-5.7

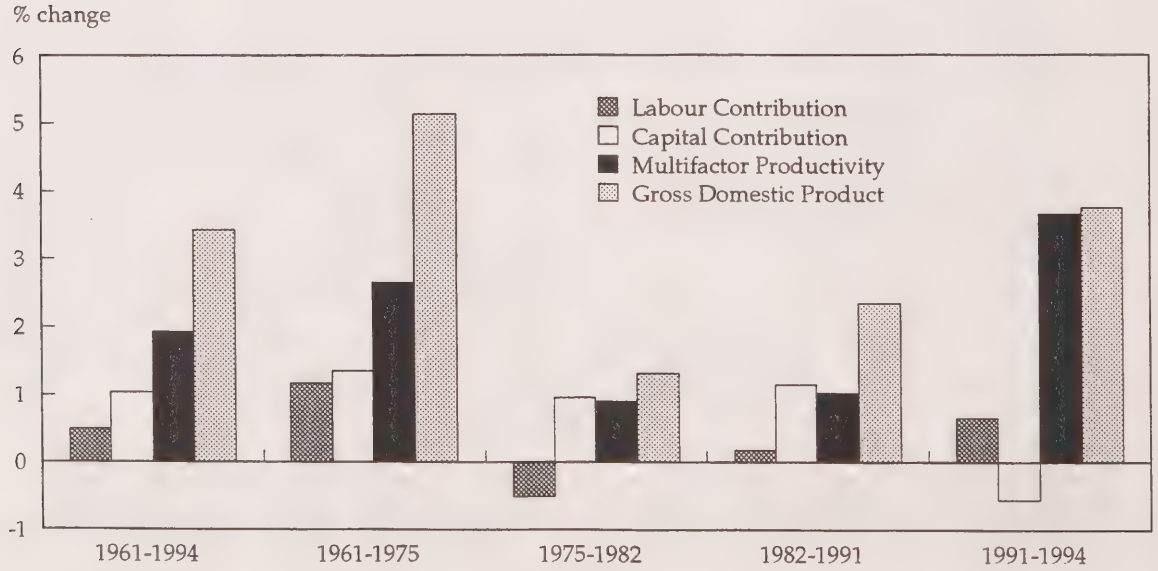


Table 5 - Agricultural & related services industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	76.1	77.9	80.3	85.9	107.5	107.4	72.3	80.4	66.5	57.3
1975	81.1	83.6	86.0	92.8	114.5	101.7	74.6	83.2	75.1	56.9
1976	86.7	88.5	90.8	100.8	110.3	99.7	76.2	83.2	81.6	53.5
1977	85.0	86.8	89.2	108.2	105.0	101.0	78.4	81.9	81.7	53.2
1978	82.9	84.8	87.2	112.1	105.8	106.0	85.6	87.0	83.6	61.1
1979	79.0	80.5	82.9	115.8	108.7	111.9	89.7	94.0	82.9	72.3
1980	81.1	83.1	85.5	121.4	103.9	109.0	93.2	97.3	87.3	77.0
1981	85.6	87.7	90.0	122.6	105.2	103.6	94.7	101.6	93.0	102.6
1982	87.0	90.9	92.6	124.0	101.0	102.6	95.1	97.8	95.1	100.0
1983	88.9	90.9	92.6	119.4	101.1	101.7	95.3	97.1	94.2	98.7
1984	90.9	91.5	93.1	113.1	100.9	101.3	93.6	96.3	92.8	105.6
1985	89.6	89.8	91.7	108.3	103.2	100.5	96.0	100.7	92.5	105.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	99.0	98.2	98.5	90.4	97.9	105.6	106.0	103.3	99.0	97.2
1988	100.0	98.9	99.1	83.7	92.7	108.7	102.6	100.5	95.5	107.4
1989	107.2	106.2	105.1	78.7	90.9	109.0	95.1	100.6	96.8	104.4
1990	108.8	108.8	107.2	74.7	92.1	110.4	102.9	113.1	103.3	100.6
1991	109.9	109.7	107.9	69.8	91.9	112.1	105.4	116.5	104.6	101.1
1992	109.5	109.0	107.4	65.1	89.3	119.9	107.0	118.9	103.6	103.3

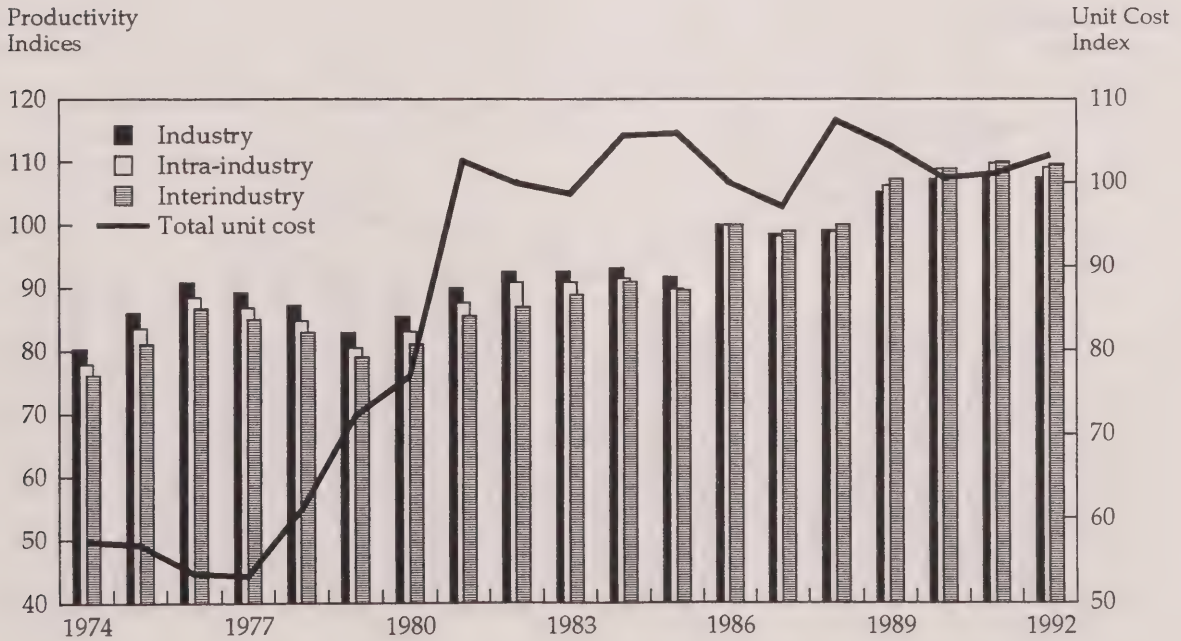


Table 6 - Manufacturing industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	91.8	92.5	94.2	77.7	102.5	91.5	83.4	73.2	80.6	42.4
1975	88.8	89.9	92.2	81.1	98.7	84.1	78.7	70.7	75.9	48.0
1976	92.3	92.5	94.2	82.7	99.2	88.1	82.8	73.6	80.4	50.6
1977	94.0	94.6	95.8	82.6	98.1	90.1	84.1	75.0	82.4	54.3
1978	94.5	95.4	96.5	82.9	101.6	94.9	88.5	79.9	86.7	59.5
1979	95.1	95.7	96.6	83.2	104.2	100.0	93.5	86.5	90.9	68.1
1980	93.1	94.2	95.5	85.5	103.7	101.1	92.7	88.2	89.9	77.2
1981	93.6	95.7	96.7	92.5	102.5	98.7	91.7	87.9	90.8	86.6
1982	89.8	92.7	94.3	99.1	93.6	86.2	82.1	81.5	81.3	92.3
1983	93.5	95.8	96.7	100.4	92.4	88.4	85.9	82.8	85.5	95.1
1984	98.5	99.3	99.5	98.5	96.3	97.3	93.5	91.2	93.9	99.1
1985	100.0	100.7	100.5	97.4	98.4	97.6	97.6	95.8	98.0	100.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	101.0	100.3	100.2	104.6	103.5	102.7	104.4	103.6	104.3	103.3
1988	101.4	100.1	100.1	110.5	108.2	107.6	112.3	110.5	110.9	107.4
1989	100.8	99.4	99.5	117.7	108.7	108.1	114.5	112.1	112.7	110.3
1990	98.5	97.6	98.1	126.4	103.1	108.5	110.2	106.5	108.0	111.3
1991	97.0	95.9	96.8	130.3	95.7	114.4	104.3	100.4	101.6	110.0
1992	97.6	96.3	97.2	131.8	93.9	106.7	107.2	99.5	102.7	110.5

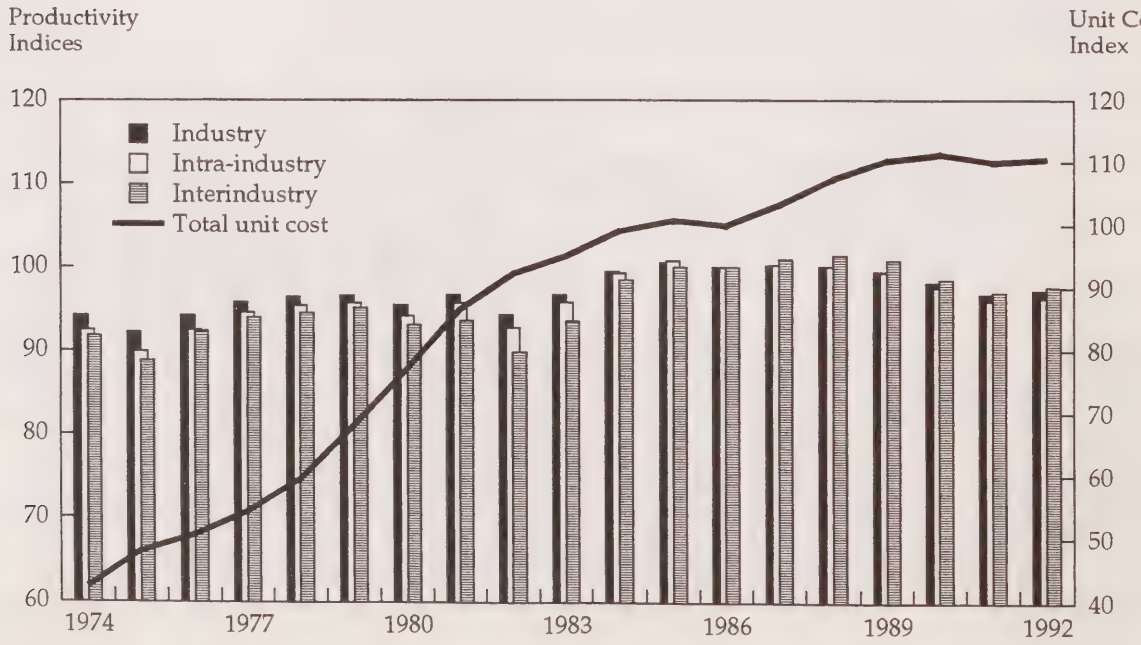


Table 7 - Construction industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	87.1	89.4	89.4	52.5	100.8	91.4	91.3	72.6	77.6	47.4
1975	89.3	93.4	93.4	55.7	98.5	92.7	91.6	75.4	81.4	52.1
1976	93.3	96.4	96.4	59.9	102.8	82.5	90.1	79.1	85.9	55.8
1977	95.2	98.2	98.2	68.4	101.7	90.1	90.5	81.9	88.7	58.7
1978	93.7	96.3	96.3	74.5	100.0	102.2	94.1	85.9	89.1	62.6
1979	93.0	94.8	94.8	78.7	105.4	113.3	98.9	92.6	92.8	68.1
1980	94.8	96.9	96.9	82.5	104.3	117.5	95.6	101.0	95.3	74.9
1981	98.7	100.8	100.8	87.2	105.0	103.7	95.9	107.7	101.1	83.6
1982	98.7	104.6	104.6	93.7	93.0	89.8	80.5	98.2	93.5	88.7
1983	100.4	104.2	104.2	96.5	91.0	84.5	84.0	90.7	92.4	91.1
1984	100.2	101.5	101.5	98.1	90.6	89.6	86.2	96.5	92.2	94.2
1985	98.9	98.9	98.9	98.2	99.3	99.9	98.0	102.7	98.4	96.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.0	99.1	99.1	103.0	109.5	105.3	114.4	106.2	109.1	105.4
1988	98.9	97.7	97.7	107.9	118.9	89.3	117.9	115.7	114.0	110.8
1989	98.4	97.9	97.9	117.0	124.4	87.9	128.2	116.1	120.4	116.2
1990	96.0	97.1	97.1	127.1	124.3	90.3	122.6	118.1	118.5	118.7
1991	95.2	97.1	97.1	134.0	113.0	95.9	112.4	112.3	110.1	115.6
1992	95.7	97.0	97.0	132.6	107.2	83.7	111.2	109.1	106.4	116.1

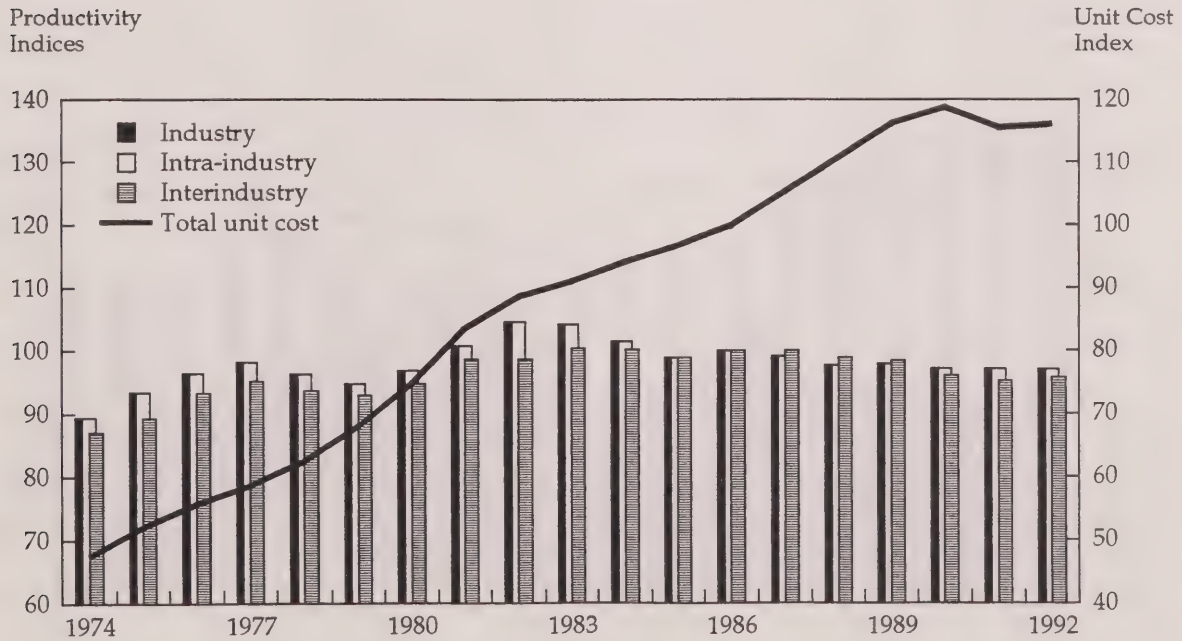


Table 8 - Transportation & storage industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	91.4	88.9	90.0	78.9	95.4	90.9	88.9	63.3	74.0	41.0
1975	89.9	88.2	89.4	81.1	93.3	97.9	80.7	61.2	72.5	46.5
1976	90.8	88.9	90.1	81.5	90.7	91.7	82.7	60.7	71.8	51.8
1977	92.0	89.7	90.8	80.1	94.8	93.6	82.8	65.6	75.2	56.1
1978	92.8	91.1	92.0	79.3	98.9	99.2	85.2	70.7	79.6	60.3
1979	97.8	96.2	96.5	79.9	101.2	111.3	94.9	81.7	89.7	63.4
1980	93.1	91.9	92.8	82.9	106.5	115.2	100.7	84.2	89.8	72.0
1981	92.3	91.6	92.5	85.9	105.7	106.8	98.5	83.4	88.6	82.5
1982	89.7	90.3	91.4	93.7	98.0	93.0	94.3	77.3	82.4	90.6
1983	96.0	96.1	96.5	99.2	91.4	86.7	88.3	76.8	84.1	94.0
1984	100.0	99.7	99.7	99.0	96.0	93.5	87.3	88.9	93.1	95.8
1985	101.0	100.4	100.4	100.0	96.1	98.4	98.7	93.7	96.8	99.6
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	103.4	103.3	102.9	99.0	101.2	100.1	109.0	105.8	105.6	101.2
1988	106.8	106.6	105.8	97.6	102.3	103.6	116.6	110.8	111.2	99.3
1989	105.5	105.2	104.6	100.9	102.9	107.1	122.0	117.0	113.4	104.1
1990	102.7	103.6	103.1	103.1	101.4	114.3	117.0	119.7	112.9	108.9
1991	100.7	102.1	101.9	102.2	97.0	116.8	104.9	115.0	107.6	113.3
1992	100.6	102.3	102.0	106.6	97.6	114.2	109.2	116.7	109.2	113.3

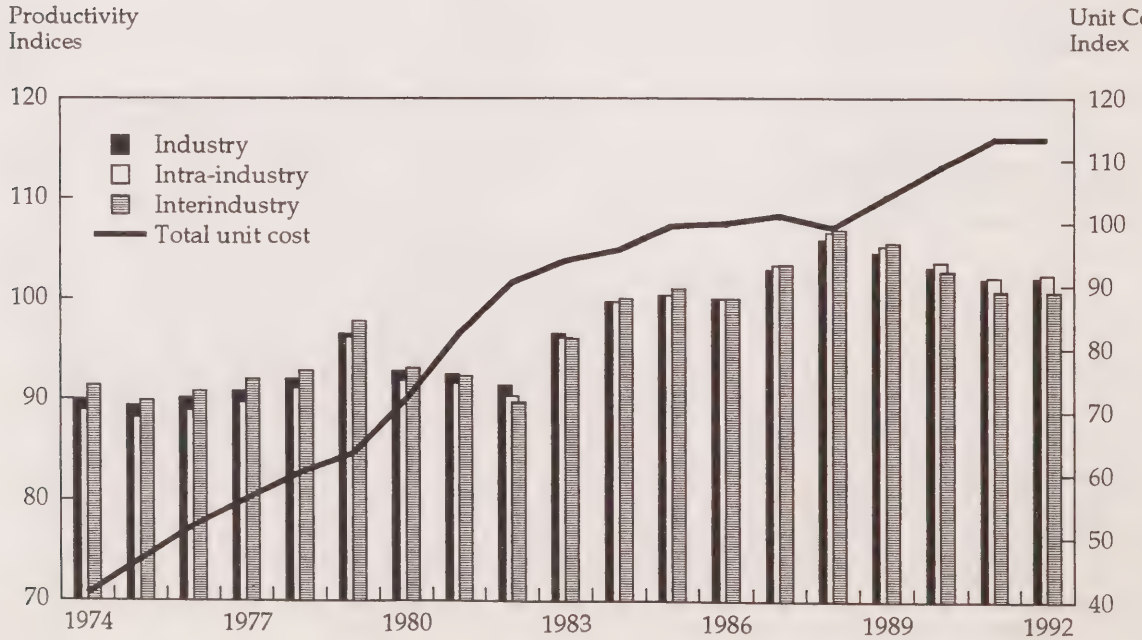


Table 9 - Telecommunication industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	63.4	63.1	63.8	72.3	88.0	58.6	42.0	50.1	46.3	50.9
1975	68.6	68.2	68.9	78.1	86.8	58.6	49.4	50.0	51.3	53.0
1976	70.9	70.1	70.7	82.6	93.1	59.0	48.1	53.4	55.9	56.8
1977	71.1	70.9	71.5	87.6	95.9	68.2	51.2	57.4	59.3	61.8
1978	75.7	75.2	75.7	91.4	95.2	75.4	52.6	64.0	64.5	66.0
1979	81.1	80.3	80.8	92.0	95.7	79.6	57.0	67.4	70.0	70.1
1980	84.1	84.7	85.0	92.5	98.3	83.4	69.8	72.0	76.4	71.9
1981	87.9	88.1	88.4	95.8	100.3	85.1	75.1	74.9	81.9	77.7
1982	86.2	86.3	86.7	100.6	102.2	82.6	75.3	76.6	82.5	89.1
1983	89.3	89.2	89.5	103.1	98.1	83.5	80.2	79.4	85.1	94.4
1984	92.4	92.7	92.9	101.3	99.6	92.3	85.4	86.7	90.0	98.8
1985	95.4	95.9	96.0	100.2	101.2	101.6	92.5	93.2	94.9	99.7
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	102.7	103.6	103.5	101.6	102.3	103.5	99.5	106.1	106.2	100.0
1988	105.8	105.8	105.6	107.3	104.3	105.1	125.8	110.2	113.9	99.7
1989	110.2	111.1	110.8	115.4	104.5	97.6	128.1	118.0	124.1	99.4
1990	112.4	114.1	113.7	127.0	102.7	92.7	125.3	125.2	131.8	99.9
1991	113.4	115.5	115.0	138.7	100.6	91.1	124.0	123.6	135.8	100.4
1992	115.5	116.5	116.0	147.3	99.4	85.9	114.9	121.6	138.1	101.9

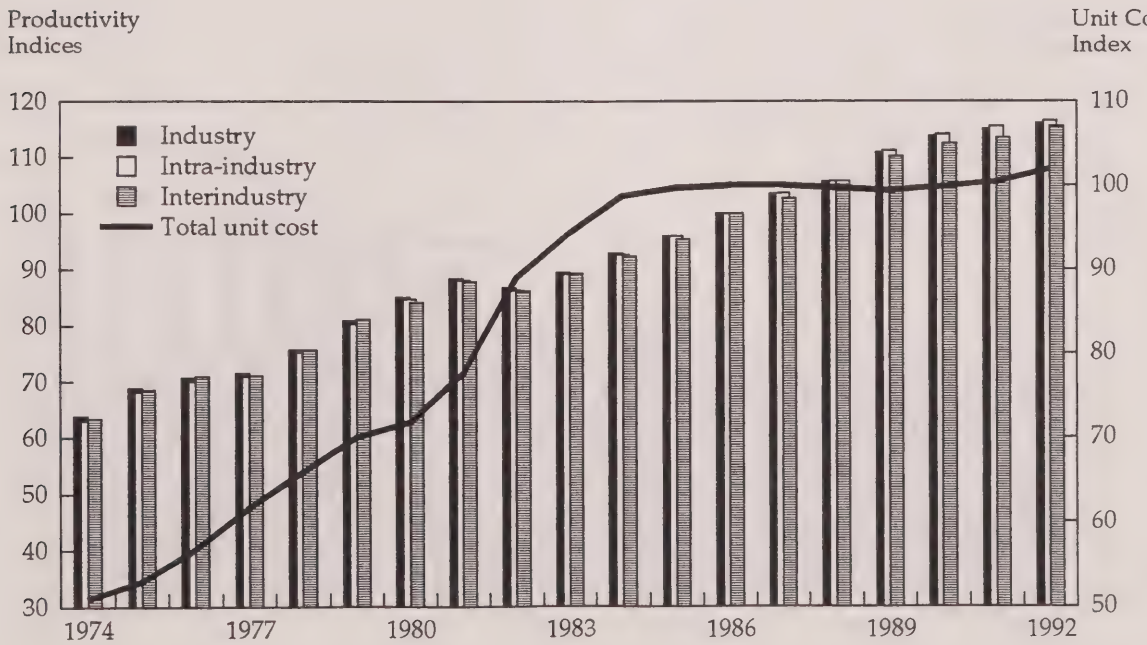


Table 10 - Wholesale trade industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	82.8	82.9	83.2	79.9	73.7	72.8	74.4	57.5	59.0	47.9
1975	83.0	83.7	83.9	83.3	74.7	78.7	73.8	59.1	60.8	54.0
1976	86.0	86.5	86.7	84.4	75.8	73.8	76.7	63.4	64.3	57.8
1977	83.6	83.9	84.1	86.2	77.2	80.8	80.8	64.4	63.8	59.8
1978	82.0	82.3	82.5	85.6	82.1	93.7	83.4	68.0	66.0	64.0
1979	85.7	85.6	85.8	84.9	82.4	100.8	86.5	74.1	70.3	71.4
1980	90.1	90.2	90.4	87.3	81.3	107.9	87.7	78.9	75.0	77.0
1981	91.0	91.3	91.4	90.0	86.7	98.4	84.6	82.3	79.1	83.2
1982	86.8	88.2	88.4	93.0	82.1	88.2	77.0	81.1	73.7	90.2
1983	90.6	91.5	91.6	88.6	87.1	86.3	82.8	80.1	78.3	93.8
1984	92.9	93.1	93.2	90.9	92.7	96.8	88.8	84.8	84.3	97.3
1985	96.8	97.0	97.0	96.2	98.4	98.3	96.0	91.2	93.3	97.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	102.0	101.6	101.6	103.9	105.9	95.0	103.3	105.0	106.5	102.3
1988	104.2	103.9	103.8	108.6	109.7	95.0	113.6	114.2	114.4	106.7
1989	105.2	105.1	105.0	113.6	111.7	94.2	116.8	119.8	119.2	110.6
1990	101.5	102.3	102.3	119.0	118.4	102.7	104.9	126.6	121.7	113.7
1991	101.8	102.9	102.9	122.1	112.8	115.7	96.0	124.2	119.1	114.2
1992	101.5	102.8	102.8	139.3	111.2	112.7	89.0	123.7	119.4	113.1

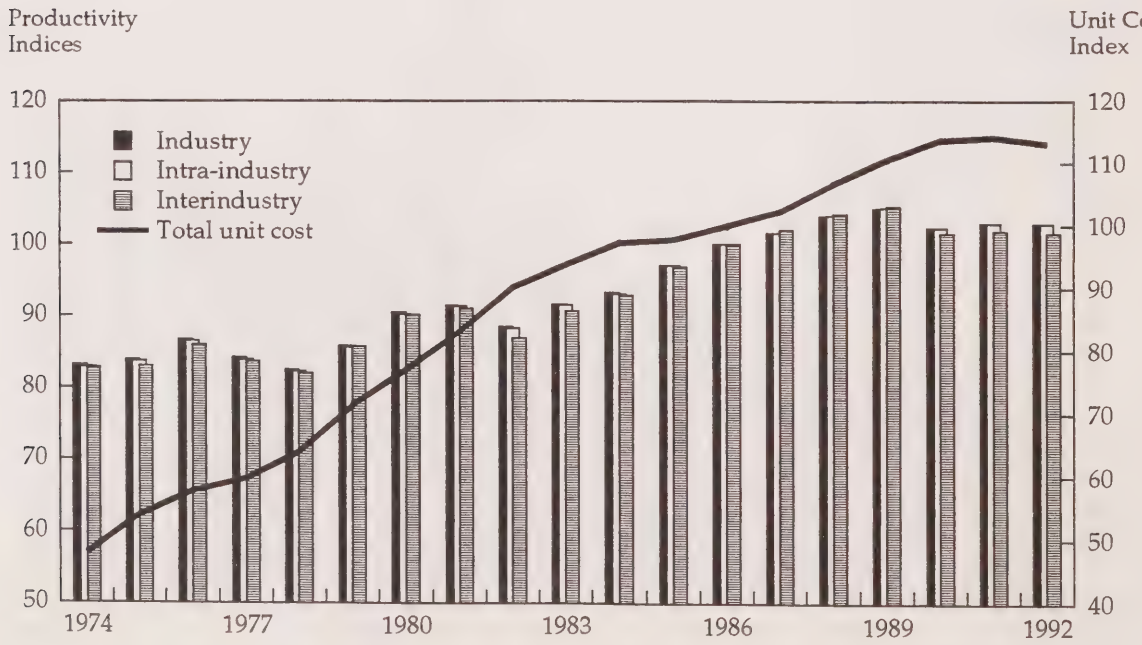


Table 11 - Retail trade industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	91.6	92.1	92.2	83.3	82.7	81.1	101.0	56.3	72.0	41.9
1975	92.5	93.4	93.5	86.7	84.7	83.9	104.7	58.1	75.2	47.6
1976	96.8	97.3	97.3	87.9	84.2	79.2	100.2	61.2	78.4	51.5
1977	97.0	97.5	97.5	89.5	84.5	84.8	102.5	64.1	79.8	54.1
1978	96.1	96.5	96.6	88.9	87.9	92.4	106.5	69.2	82.5	58.0
1979	95.3	95.6	95.6	88.1	91.0	96.1	97.5	72.8	83.6	64.3
1980	93.2	93.5	93.6	90.3	93.5	100.9	100.6	76.5	84.4	71.6
1981	91.9	92.3	92.3	92.5	96.8	91.9	94.4	78.9	85.0	79.5
1982	90.9	92.5	92.6	95.1	92.1	87.9	85.1	79.0	82.4	87.3
1983	98.3	99.6	99.6	91.0	87.1	87.0	85.8	81.2	85.8	89.1
1984	99.1	99.5	99.5	92.7	93.0	94.8	89.9	85.1	90.7	92.9
1985	99.7	100.0	100.0	97.3	96.7	97.8	93.4	91.1	95.4	96.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	103.6	103.4	103.4	103.0	100.4	100.7	101.6	105.4	105.3	104.3
1988	103.6	103.6	103.6	107.2	102.8	101.0	102.5	113.4	109.3	109.4
1989	103.8	104.1	104.1	111.6	104.1	100.3	104.0	119.7	112.7	113.5
1990	100.5	101.9	101.9	116.6	105.1	110.1	88.4	124.0	111.7	118.0
1991	98.4	100.1	100.1	119.3	101.9	118.3	80.1	123.1	107.6	121.9
1992	97.5	99.4	99.4	144.8	101.4	119.0	85.9	121.5	108.6	120.2

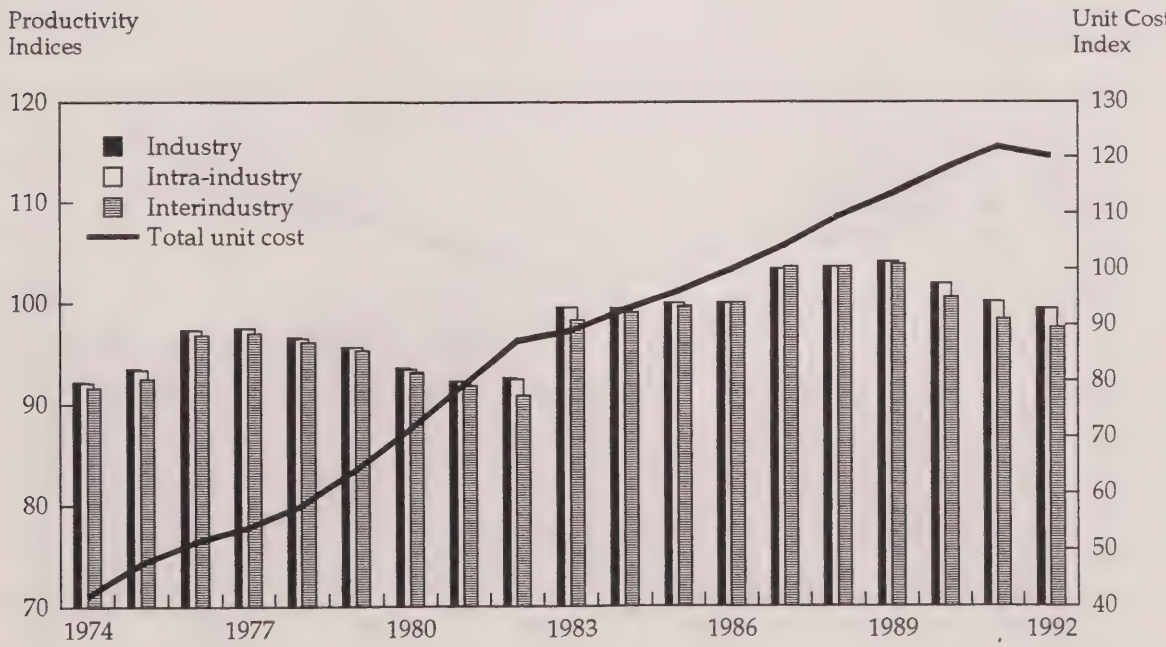


Table 12 - Food industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	86.4	96.9	97.4	74.5	100.9	88.5	78.3	75.6	78.7	48.2
1975	85.9	95.1	95.8	77.1	101.0	89.8	78.5	75.5	77.8	53.8
1976	91.7	98.2	98.5	78.5	100.5	87.7	83.0	77.3	83.2	53.7
1977	92.6	99.4	99.5	78.8	101.1	90.3	85.9	79.9	86.4	56.7
1978	91.8	99.4	99.5	80.3	102.9	92.9	88.4	83.4	88.8	63.6
1979	90.0	99.5	99.6	82.2	103.4	100.1	90.0	87.6	90.6	72.1
1980	89.4	98.3	98.5	86.5	103.7	104.2	94.1	90.1	93.1	77.9
1981	91.1	98.0	98.3	94.4	101.2	97.5	96.8	89.2	94.8	85.4
1982	91.5	98.4	98.7	95.7	97.8	94.2	95.3	89.4	93.8	89.1
1983	92.4	97.7	98.1	99.3	97.8	92.6	96.4	89.9	94.3	91.5
1984	95.1	98.8	99.0	99.5	98.4	93.9	97.9	93.3	96.6	96.1
1985	96.9	100.5	100.4	99.1	99.4	92.6	99.8	95.8	99.5	96.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	99.6	99.7	99.8	102.0	101.5	97.4	103.1	104.3	102.5	102.9
1988	97.7	97.5	97.9	107.2	103.9	100.0	104.0	107.0	102.4	106.8
1989	98.1	96.0	96.6	112.3	103.9	94.2	104.4	111.2	102.2	109.6
1990	97.5	95.5	96.1	118.9	103.6	96.5	103.6	109.6	101.9	112.1
1991	97.8	96.3	96.8	122.2	100.3	100.7	102.1	109.9	101.8	112.4
1992	97.6	96.3	96.8	125.0	101.7	100.9	102.8	109.7	102.7	113.1

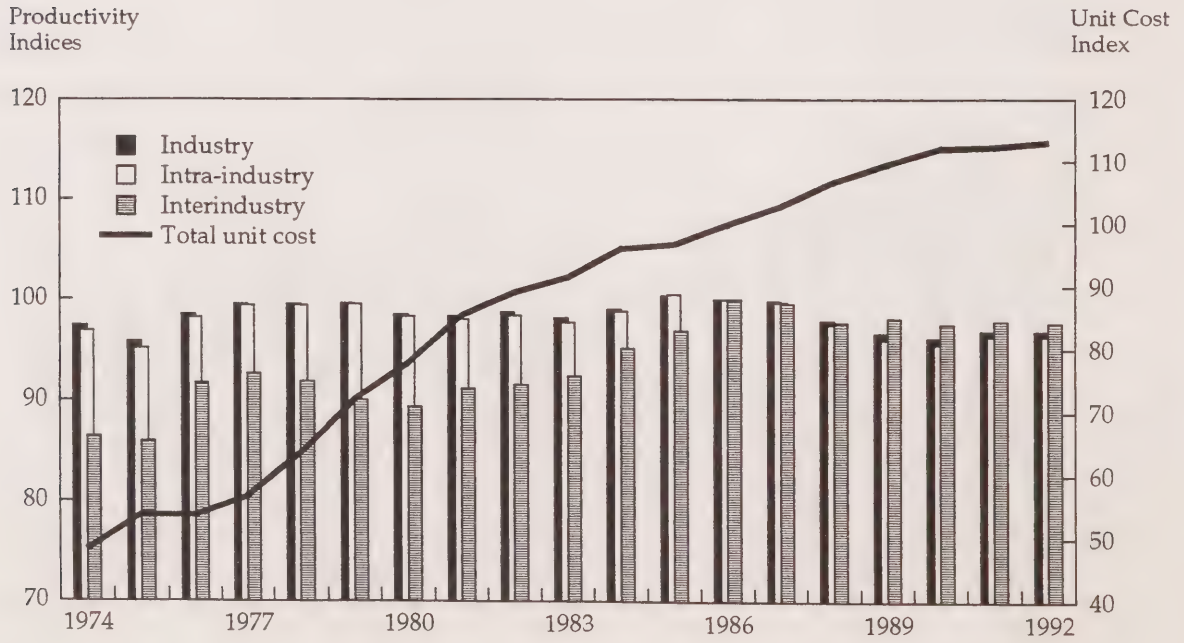


Table 13 - Beverage industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	105.5	108.1	107.6	99.7	105.1	107.1	71.8	83.7	93.7	37.6
1975	101.9	105.5	105.2	99.0	106.0	106.6	70.7	83.7	91.0	43.7
1976	103.9	105.5	105.1	94.6	105.7	101.2	72.2	82.9	90.5	45.2
1977	106.9	108.6	108.1	91.6	106.0	104.4	72.5	84.4	92.9	47.5
1978	107.0	107.9	107.4	92.8	104.4	102.9	72.9	85.2	92.6	51.1
1979	107.2	108.1	107.6	91.1	106.3	113.3	77.5	90.0	95.7	56.0
1980	106.3	107.9	107.4	89.7	102.7	115.2	77.9	93.5	95.2	64.6
1981	106.5	107.6	107.1	91.1	102.7	108.4	82.5	94.7	97.5	73.9
1982	101.3	104.2	103.9	88.8	100.1	101.7	83.7	93.9	93.7	82.6
1983	102.1	103.4	103.2	86.5	99.0	96.4	86.7	92.8	93.2	89.0
1984	104.9	104.5	104.2	89.9	97.6	100.9	88.9	93.4	95.8	93.0
1985	102.8	102.4	102.2	96.3	100.9	96.7	96.4	96.9	99.6	96.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	101.8	101.4	101.3	96.1	100.1	93.9	103.8	103.3	102.3	102.6
1988	103.5	102.9	102.7	94.2	102.2	95.4	107.9	105.9	105.7	109.2
1989	105.8	105.6	105.2	96.6	87.5	83.7	100.2	105.4	102.4	110.3
1990	105.1	105.9	105.5	94.8	77.2	74.4	93.0	99.9	96.1	113.1
1991	99.8	101.0	100.8	98.2	74.2	77.1	91.0	104.1	91.9	120.5
1992	103.3	104.6	104.1	96.9	82.0	73.8	100.4	99.9	99.1	122.2

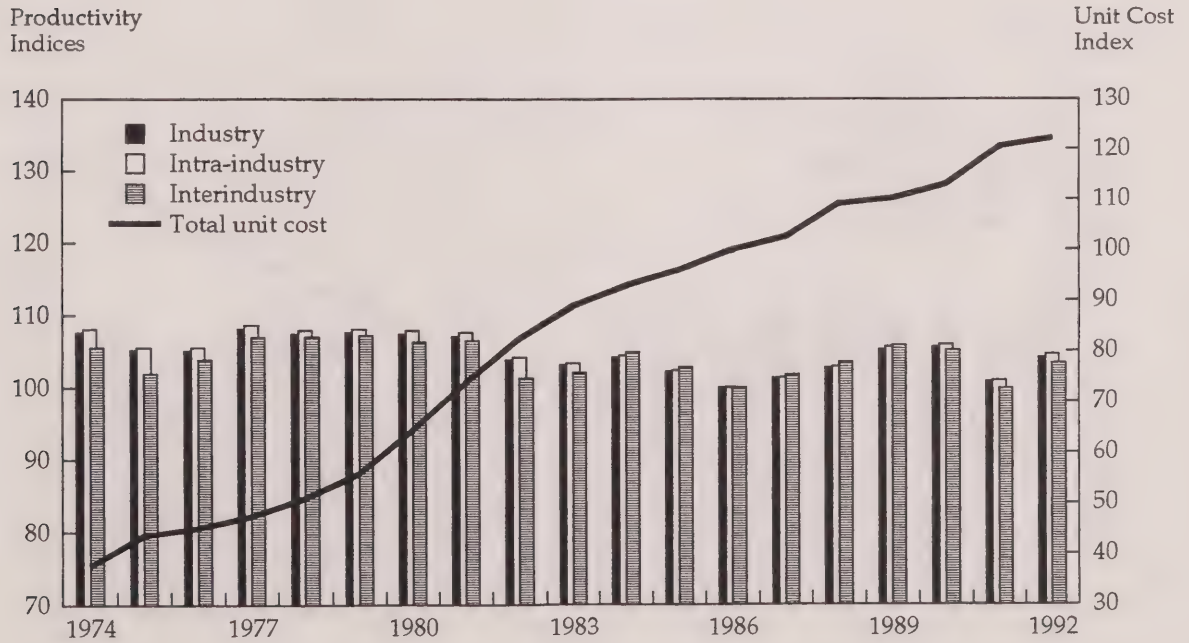


Table 14 - Tobacco products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	101.1	108.7	107.5	83.9	147.6	111.2	113.9	94.6	118.2	35.7
1975	100.0	106.6	105.8	93.5	151.0	105.5	106.3	95.3	114.6	42.0
1976	101.5	105.4	104.8	94.6	142.1	106.2	114.0	100.2	117.8	45.4
1977	110.4	114.9	112.5	87.6	136.0	110.6	107.4	100.0	120.0	47.0
1978	103.9	108.5	107.2	84.9	133.7	111.8	111.4	99.4	115.6	51.7
1979	104.3	109.5	108.1	86.6	133.0	113.0	114.3	103.2	119.0	56.3
1980	106.0	110.8	109.2	87.6	127.2	121.0	101.8	104.4	112.6	62.4
1981	106.8	110.1	108.6	93.0	132.5	106.8	111.9	108.5	120.3	70.1
1982	105.4	110.1	108.6	91.4	128.7	111.1	107.4	104.5	116.3	78.2
1983	104.0	106.7	105.7	95.7	120.0	105.9	96.1	99.9	106.1	84.5
1984	104.0	105.3	104.5	96.8	113.3	111.5	101.9	101.9	107.5	89.1
1985	97.9	99.3	99.4	97.3	107.6	97.9	89.2	94.2	94.0	94.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	106.3	106.1	105.4	96.8	87.5	88.5	78.4	93.3	90.8	105.5
1988	111.2	111.1	109.7	91.4	81.3	87.7	76.3	90.1	90.5	112.9
1989	110.1	109.3	108.2	87.1	75.2	82.1	83.2	91.4	90.3	120.3
1990	106.4	106.5	105.9	89.2	72.9	83.2	79.6	84.9	86.2	128.0
1991	107.8	108.1	107.2	83.3	72.3	88.4	77.9	86.3	84.7	135.2
1992	104.3	104.9	104.4	79.0	72.6	87.0	77.8	82.5	80.5	149.5

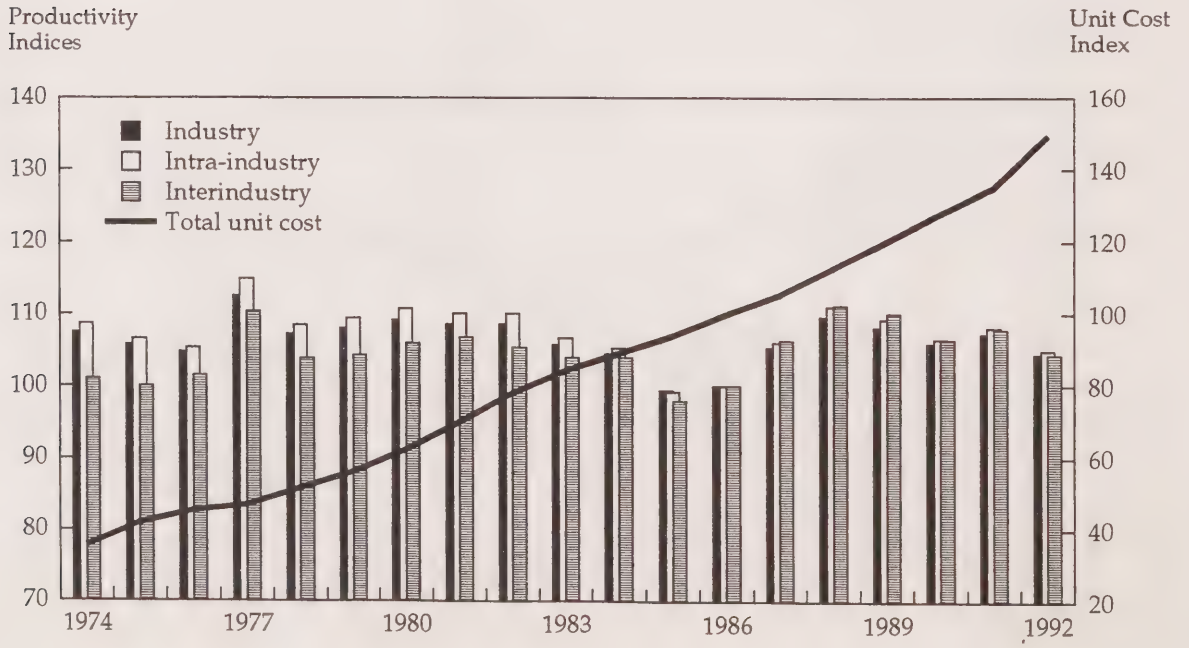


Table 15 - Rubber products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	82.5	84.2	84.6	113.9	96.1	91.9	75.2	62.3	70.7	47.3
1975	77.9	81.2	81.7	117.2	97.0	96.1	77.6	62.1	69.6	52.7
1976	85.0	87.9	88.2	116.2	102.1	100.5	85.2	68.2	80.5	54.2
1977	91.8	94.7	94.9	108.0	102.0	103.0	89.5	70.6	88.1	56.9
1978	94.1	96.5	96.6	101.1	104.0	103.4	89.2	71.5	89.7	60.0
1979	98.6	99.6	99.6	94.4	109.6	107.4	99.9	83.6	100.4	66.5
1980	94.5	96.7	96.9	93.2	103.1	103.2	89.3	81.2	90.6	77.2
1981	92.8	94.3	94.4	95.4	105.1	96.6	90.7	80.3	89.4	87.1
1982	86.9	90.9	91.1	109.2	98.5	87.0	81.0	80.4	80.7	93.7
1983	93.7	96.1	96.2	118.3	99.0	91.9	84.3	80.8	87.4	95.3
1984	104.4	105.2	105.1	109.1	100.5	100.1	95.4	93.3	102.8	96.4
1985	105.7	106.1	106.0	104.1	99.9	95.5	95.4	96.5	103.4	98.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.8	103.9	103.8	100.0	94.6	98.3	96.5	95.6	99.6	100.0
1988	104.7	103.4	103.4	101.8	103.4	97.7	98.6	98.1	103.6	102.8
1989	103.8	102.6	102.5	109.9	100.7	96.5	97.9	101.5	102.5	105.9
1990	102.4	102.4	102.3	133.6	96.6	93.4	93.0	91.9	98.1	108.2
1991	98.4	99.0	99.0	163.2	89.7	93.8	85.7	85.9	89.6	109.6
1992	108.1	108.7	108.6	152.1	91.6	94.4	94.3	91.5	103.1	110.5

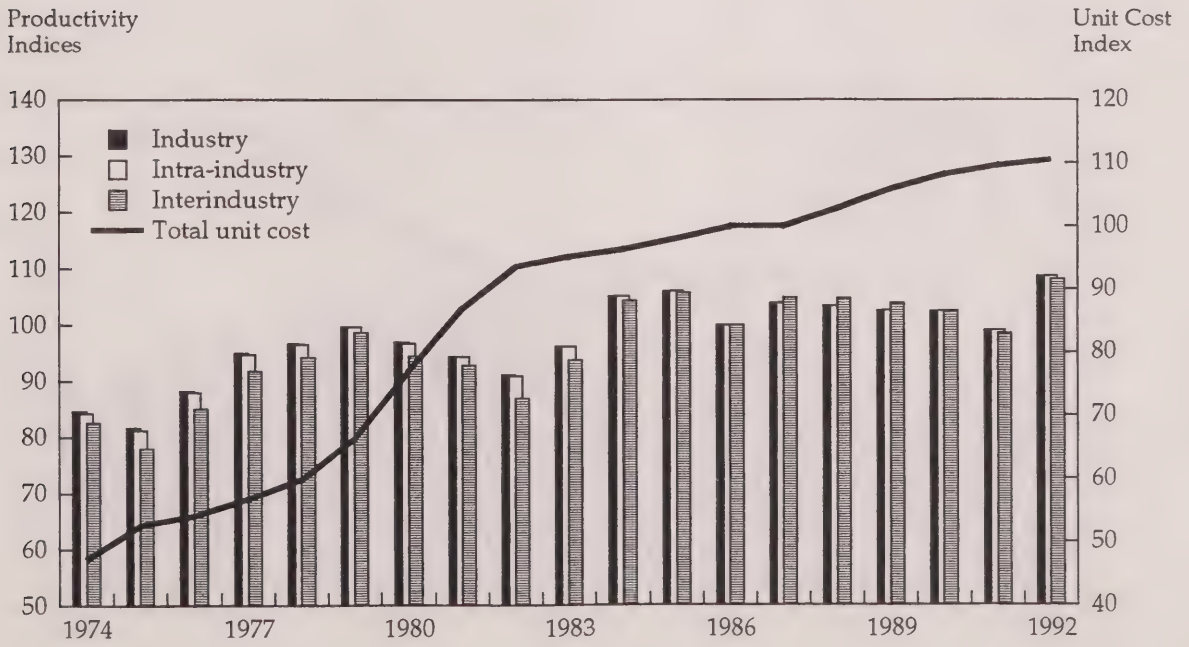


Table 16 - Plastic products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	88.8	90.3	90.6	75.0	66.6	57.2	51.8	50.4	52.1	45.4
1975	82.3	86.3	86.7	82.3	65.1	47.3	46.7	46.4	47.2	50.5
1976	84.1	86.9	87.3	84.9	68.8	53.8	53.6	49.6	52.2	53.5
1977	85.4	88.6	89.0	84.5	69.3	57.5	55.7	52.1	54.7	56.4
1978	89.4	92.0	92.3	83.8	76.0	60.8	62.6	56.7	62.2	59.4
1979	94.9	95.2	95.4	82.8	82.0	74.3	70.7	65.1	70.7	66.7
1980	91.8	93.8	94.1	87.6	82.1	81.9	70.9	67.3	70.7	76.5
1981	95.1	96.8	96.9	88.1	82.0	79.6	73.2	72.5	74.7	82.8
1982	90.5	95.5	95.6	88.3	76.4	76.0	68.1	68.3	69.4	86.6
1983	97.5	99.9	99.9	84.1	77.2	80.1	75.5	72.7	76.8	89.8
1984	102.9	103.1	103.0	81.6	85.6	87.6	82.2	80.8	85.4	93.7
1985	103.2	103.5	103.4	87.2	93.4	93.3	87.2	88.9	92.0	96.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	101.2	99.8	99.8	118.1	108.8	109.3	113.7	109.8	112.5	103.7
1988	99.3	96.8	96.9	135.9	123.5	126.0	121.5	115.5	119.5	112.4
1989	98.2	95.3	95.5	151.6	130.6	128.8	125.0	116.5	122.9	115.7
1990	94.5	93.0	93.3	165.7	126.7	130.9	121.3	114.3	118.6	114.8
1991	91.5	90.9	91.2	173.2	125.4	138.6	114.5	110.1	113.0	113.5
1992	93.6	92.8	93.0	174.8	121.7	140.6	119.9	116.8	117.7	112.0

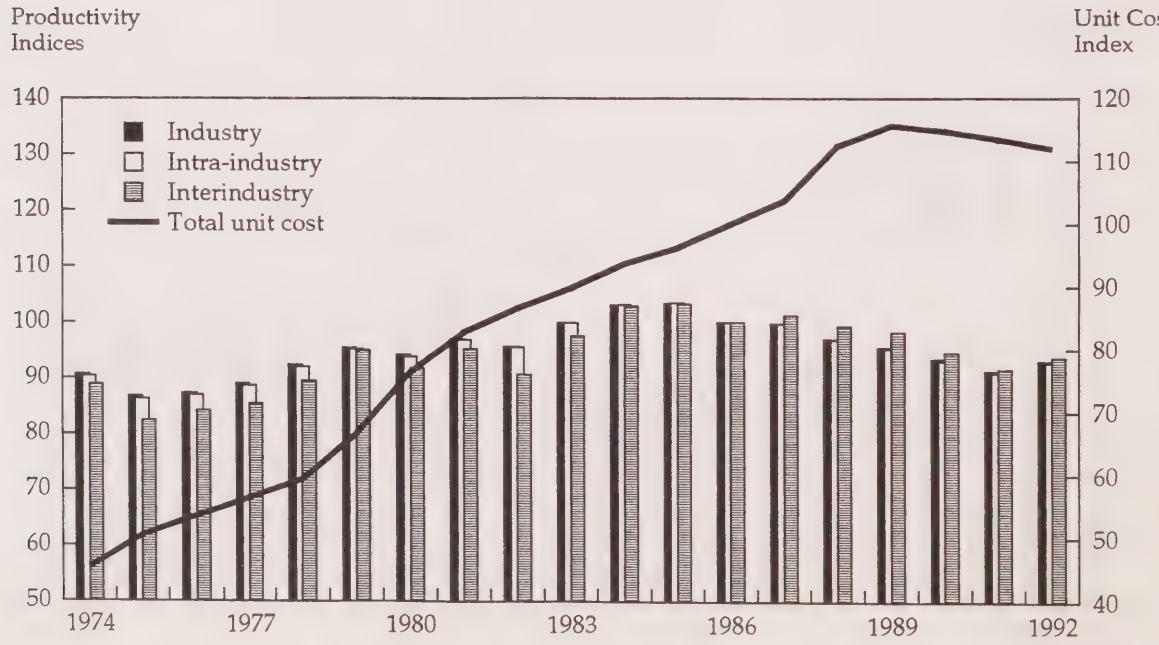


Table 17 - Leather & allied products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	82.8	85.5	86.7	105.5	128.2	126.3	121.3	97.9	103.0	44.0
1975	82.3	85.9	87.0	107.3	125.2	123.0	119.8	98.1	102.1	47.3
1976	87.4	90.0	90.8	108.2	124.9	122.8	123.6	102.3	108.6	51.6
1977	88.8	91.1	91.8	105.5	112.0	120.3	111.6	93.7	99.8	55.4
1978	94.6	96.9	97.1	102.7	114.5	126.5	122.1	102.8	111.8	60.7
1979	93.9	95.4	95.8	100.0	120.4	127.6	124.6	107.6	113.5	74.5
1980	92.4	94.2	94.7	100.0	115.9	130.6	118.2	107.5	108.2	77.9
1981	94.8	96.6	96.8	101.8	120.1	122.1	123.7	110.9	114.7	83.1
1982	90.7	94.1	94.6	102.7	104.6	95.5	100.8	98.2	96.3	87.9
1983	95.0	96.9	97.1	98.2	102.5	98.7	101.5	97.7	98.0	91.5
1984	99.1	99.6	99.6	100.0	105.6	108.8	101.8	99.7	102.3	96.3
1985	99.5	99.7	99.8	97.3	99.9	98.6	103.8	101.7	101.3	98.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.8	100.2	100.2	96.4	91.1	92.1	97.1	96.1	95.1	105.7
1988	99.4	98.9	99.0	103.6	85.5	100.1	90.7	91.8	89.2	108.5
1989	100.2	99.7	99.8	101.8	81.8	87.8	87.9	87.1	86.6	111.8
1990	96.7	97.1	97.3	96.4	72.6	78.6	78.7	70.7	74.7	117.5
1991	93.0	93.7	94.1	95.5	60.3	71.7	64.8	57.5	60.6	117.2
1992	94.6	95.2	95.5	98.2	56.9	67.6	60.8	54.3	58.5	116.7

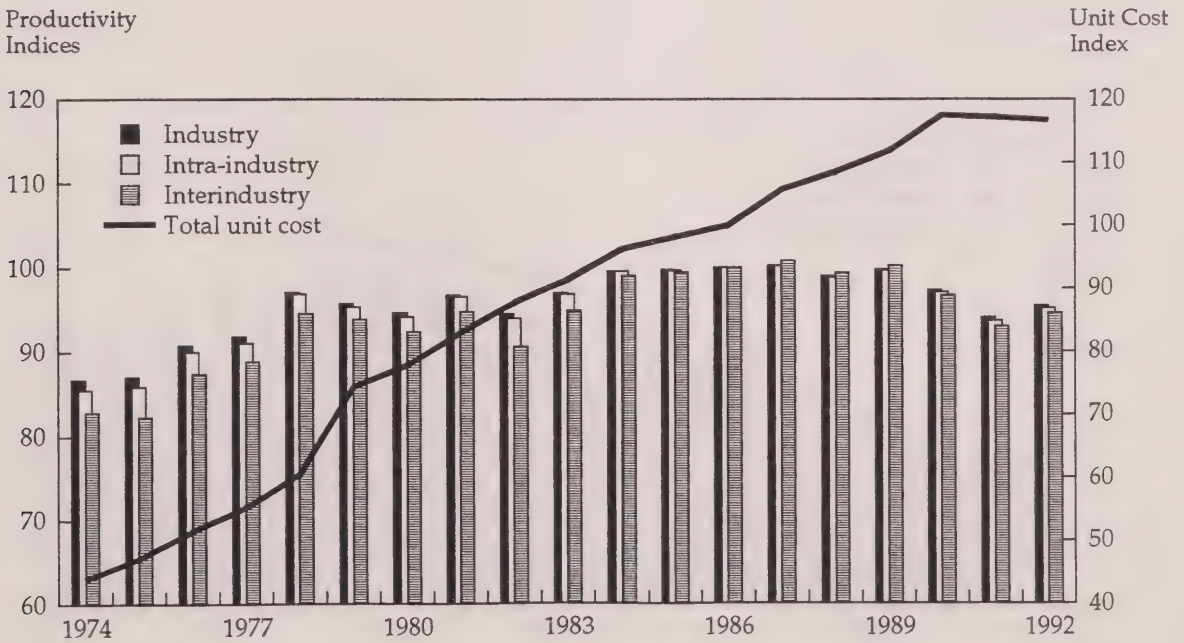


Table 18 - Primary textile & textile products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	76.8	74.6	78.9	137.1	135.2	116.4	81.8	104.7	81.0	52.7
1975	76.0	74.9	79.1	143.2	126.5	116.3	78.0	96.0	77.5	54.2
1976	79.1	77.2	81.1	146.6	117.9	110.9	78.0	94.2	77.8	57.5
1977	82.8	81.0	84.3	138.5	109.7	106.8	80.7	92.3	79.9	60.7
1978	86.6	85.0	87.6	124.5	111.8	112.0	85.3	96.4	85.5	63.9
1979	90.2	88.3	90.4	113.6	115.8	119.7	94.7	102.4	93.6	71.8
1980	89.7	88.7	90.7	106.6	113.4	122.6	90.4	97.4	90.2	81.0
1981	91.9	91.2	92.8	109.0	111.9	118.9	92.0	97.4	92.9	89.4
1982	85.2	85.6	88.2	105.5	98.7	96.4	77.3	88.1	76.8	92.9
1983	94.4	94.5	95.5	100.8	103.9	104.1	92.5	93.1	92.3	95.0
1984	96.5	95.3	96.1	97.4	101.5	102.7	91.1	92.7	91.3	97.5
1985	97.2	96.4	97.1	99.7	96.6	92.1	91.4	93.4	91.2	98.6
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.2	99.9	99.9	105.3	102.4	101.2	108.4	107.3	106.1	102.2
1988	97.8	97.6	98.0	106.8	104.1	108.3	106.1	113.3	104.5	106.9
1989	96.7	95.9	96.7	110.9	101.4	103.9	106.0	111.0	102.5	109.7
1990	94.2	94.2	95.2	113.1	92.6	104.0	97.7	101.9	94.1	111.3
1991	92.3	92.6	93.8	116.7	88.5	103.9	88.2	92.0	86.5	111.2
1992	93.9	94.4	95.4	115.2	79.6	99.3	86.5	85.9	83.7	110.8

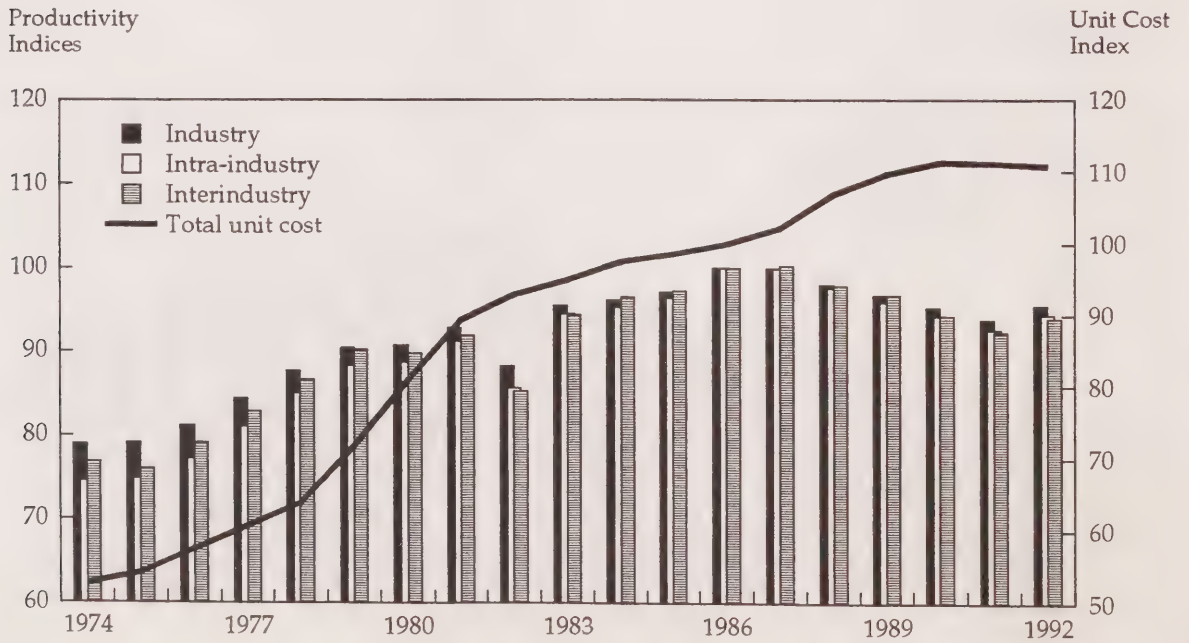


Table 19 - Clothing industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	78.4	86.1	86.6	117.3	109.9	85.7	87.0	78.4	82.3	49.5
1975	79.6	87.6	88.1	116.8	109.1	81.6	91.5	77.3	85.0	53.0
1976	82.9	90.2	90.5	113.4	110.2	82.5	95.5	84.5	90.3	57.0
1977	85.7	92.2	92.5	107.4	102.0	80.4	92.0	80.1	87.3	60.7
1978	90.4	95.8	95.9	101.5	102.5	98.7	94.3	86.3	92.4	65.1
1979	93.6	97.9	98.0	100.0	103.9	88.7	95.6	92.9	96.3	72.9
1980	93.6	97.6	97.7	99.0	98.3	93.1	90.6	88.9	91.5	79.6
1981	95.0	98.2	98.3	107.9	96.9	87.2	88.1	86.5	91.0	85.8
1982	90.0	95.5	95.7	109.9	89.9	79.0	80.0	79.8	82.1	91.1
1983	91.8	94.5	94.7	102.0	95.8	84.9	87.3	83.1	85.8	94.3
1984	95.2	97.0	97.1	102.0	97.3	90.4	88.5	86.6	89.7	96.3
1985	97.2	98.4	98.5	103.0	96.9	92.0	90.7	93.0	93.0	97.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.9	100.7	100.6	102.5	102.2	95.1	103.4	107.2	104.3	103.2
1988	98.1	98.4	98.5	110.9	103.2	99.7	104.1	109.2	103.8	105.8
1989	97.9	98.6	98.6	118.3	99.6	88.1	112.3	109.1	106.3	109.2
1990	96.0	97.8	97.9	126.2	92.9	100.0	104.4	104.3	100.4	112.2
1991	94.6	96.9	97.1	127.2	84.2	99.9	90.2	93.7	89.7	113.5
1992	94.9	97.1	97.3	138.6	76.6	90.9	87.0	88.8	85.9	113.9

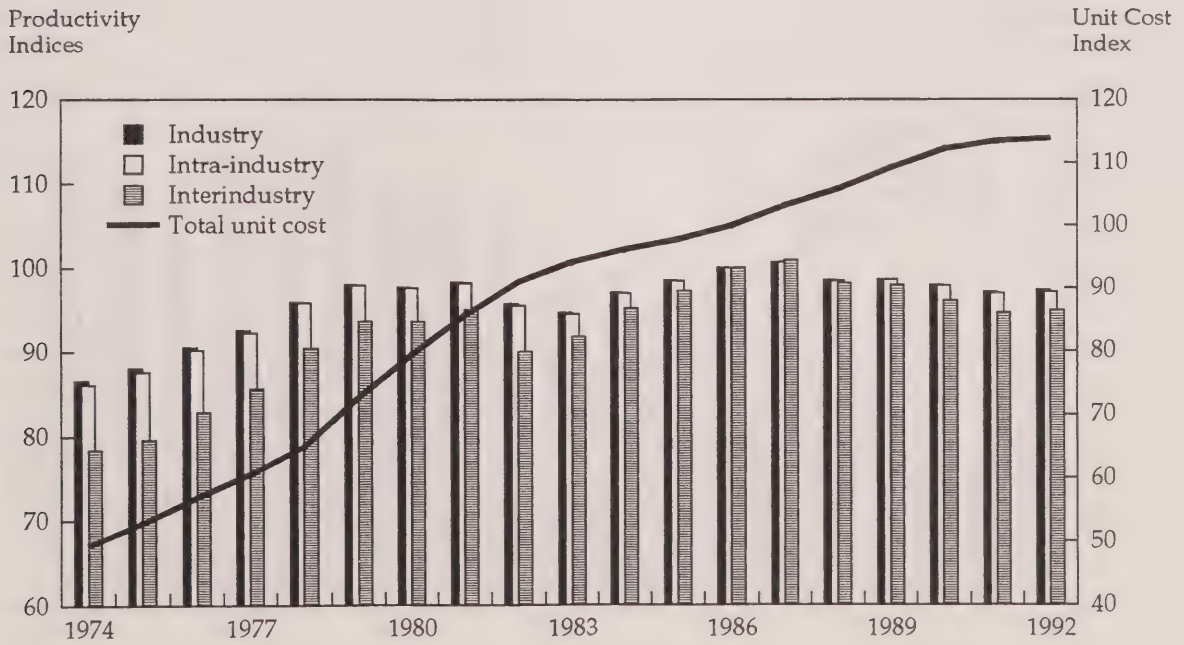


Table 20 - Wood industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	69.6	80.9	82.5	127.3	101.3	75.5	71.2	64.1	66.8	49.0
1975	66.1	79.2	80.9	137.9	92.0	71.4	64.4	60.2	60.6	51.6
1976	70.9	82.5	83.9	139.6	101.8	80.9	78.0	69.1	72.4	57.5
1977	74.2	85.4	86.6	140.9	104.1	85.2	80.2	73.2	76.9	64.2
1978	73.4	84.3	85.6	138.8	111.1	93.3	84.3	80.5	80.2	75.1
1979	74.0	84.2	85.5	140.5	114.0	99.4	86.8	85.9	82.7	86.1
1980	77.9	87.5	88.5	145.2	108.9	98.3	83.2	87.0	83.5	82.2
1981	79.4	89.4	90.3	144.0	98.5	95.5	80.7	83.8	80.9	84.3
1982	78.1	88.5	89.4	140.4	81.4	81.9	69.0	71.7	67.9	84.4
1983	85.5	92.3	93.0	122.0	90.8	89.1	85.9	81.3	82.4	92.6
1984	93.7	96.6	96.9	110.9	93.6	93.8	89.7	85.2	88.7	91.0
1985	97.9	100.0	100.0	104.2	98.1	97.5	93.2	95.2	96.1	93.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.2	102.7	102.4	103.7	109.6	104.7	114.9	110.3	113.7	103.9
1988	104.8	100.9	100.8	117.6	113.1	108.5	122.0	115.5	118.5	104.6
1989	103.2	98.7	98.8	143.1	111.0	106.1	124.5	116.1	118.6	107.7
1990	100.4	96.8	97.1	160.5	102.4	105.8	120.2	108.8	111.7	106.7
1991	99.5	97.4	97.7	158.7	88.3	106.1	107.4	97.3	100.1	105.1
1992	101.3	98.7	98.8	145.0	93.1	109.0	112.5	104.1	106.0	112.3

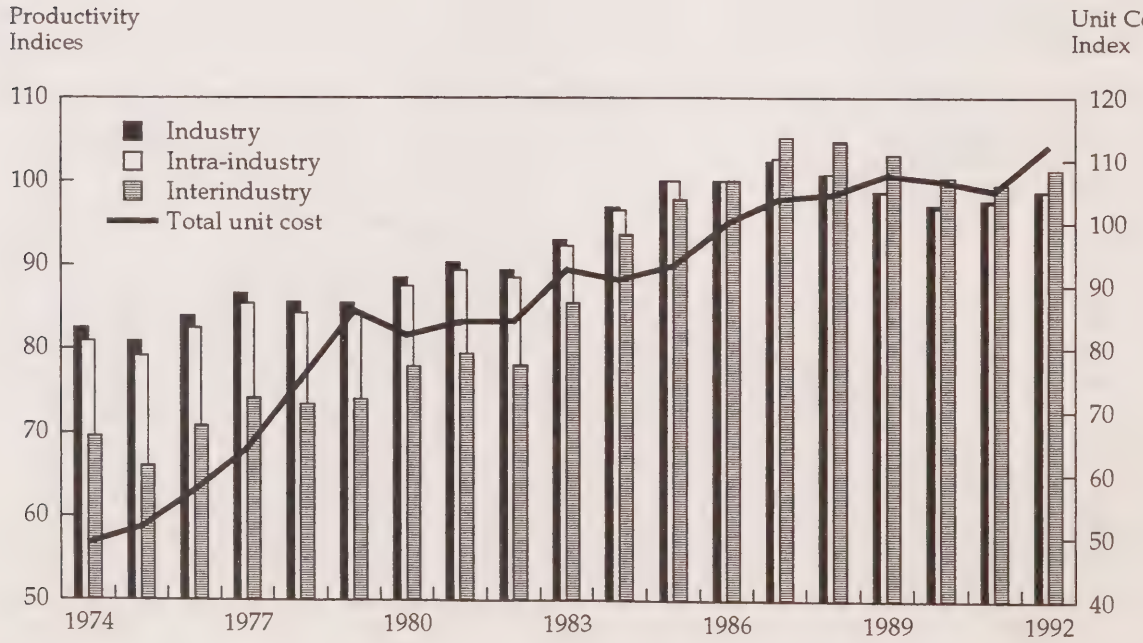


Table 21 - Furniture & fixture industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	91.2	96.5	96.6	98.7	90.1	82.7	70.6	70.3	77.3	41.1
1975	87.9	95.0	95.2	108.4	87.5	82.4	61.3	65.8	71.0	45.3
1976	94.0	100.1	100.1	107.8	85.2	82.0	64.7	68.5	76.1	47.6
1977	95.7	101.2	101.2	102.4	77.5	78.8	59.1	63.8	70.6	50.9
1978	100.3	105.5	105.3	97.5	79.3	77.7	60.6	67.2	75.1	54.5
1979	98.9	102.9	102.8	91.5	87.6	80.5	64.9	71.5	78.3	61.7
1980	97.4	101.5	101.5	90.5	86.1	84.5	65.9	77.2	78.1	69.0
1981	99.1	102.9	102.8	90.1	89.0	89.2	75.5	82.9	85.4	77.2
1982	87.0	92.9	93.1	100.3	80.5	79.2	63.2	75.4	69.2	85.1
1983	95.4	98.9	98.9	97.4	77.3	80.0	70.0	78.4	75.9	88.4
1984	99.8	101.2	101.1	90.4	81.1	85.1	75.8	82.6	81.3	92.6
1985	101.8	102.1	102.0	90.3	89.4	89.9	83.0	86.7	88.2	95.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	95.9	95.0	95.3	112.1	111.5	108.0	109.5	106.9	104.8	104.2
1988	93.3	92.5	92.8	124.3	112.8	123.6	112.4	116.0	106.1	108.3
1989	93.0	92.4	92.7	128.6	110.0	123.0	117.3	121.7	108.2	113.0
1990	90.6	91.3	91.6	126.1	105.2	120.8	104.6	111.1	99.0	116.6
1991	87.4	88.7	89.1	122.2	91.0	113.4	87.3	99.7	83.7	116.7
1992	91.4	92.4	92.7	120.0	80.5	99.6	85.0	96.8	81.9	116.1

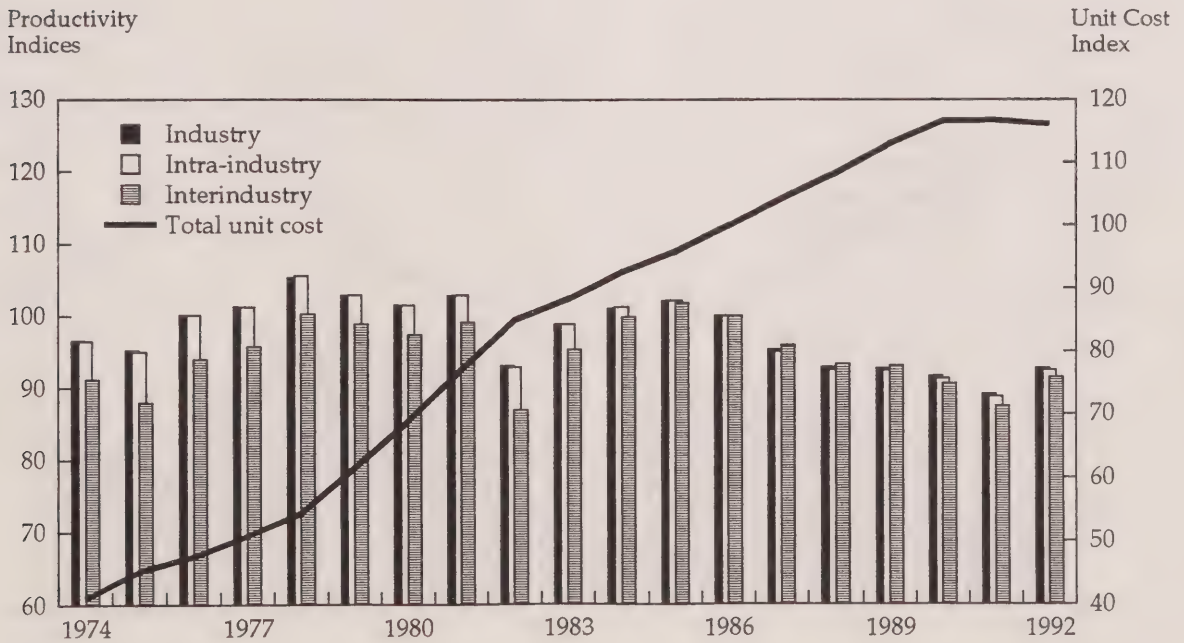


Table 22 - Paper & allied products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	97.2	104.4	103.7	76.5	112.8	101.9	77.8	75.6	88.8	42.7
1975	83.0	92.0	92.9	76.7	98.6	86.2	64.0	67.5	69.8	50.3
1976	91.2	98.8	98.9	76.0	107.3	97.4	70.9	73.1	80.3	51.5
1977	91.5	98.5	98.6	76.4	106.5	98.6	71.2	71.2	80.0	54.7
1978	93.5	100.6	100.5	77.2	114.2	102.9	77.4	77.1	87.0	56.9
1979	95.6	101.7	101.5	75.5	108.6	108.1	82.3	82.6	89.7	67.5
1980	93.8	100.2	100.2	75.3	115.9	105.0	86.0	85.6	91.6	77.6
1981	93.3	99.8	99.8	80.6	108.5	100.3	84.2	84.8	89.9	85.4
1982	85.4	93.4	94.2	93.5	100.9	89.5	79.1	82.3	81.7	88.2
1983	92.8	98.1	98.4	97.9	98.1	92.0	84.2	82.7	87.8	85.4
1984	97.3	99.5	99.6	93.1	99.3	100.9	89.3	90.2	92.7	94.4
1985	98.4	99.7	99.7	90.7	98.0	98.9	93.2	92.7	94.1	96.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	103.5	101.5	101.3	104.4	101.4	101.9	103.4	107.9	104.9	109.2
1988	101.9	99.6	99.7	114.6	103.5	109.6	105.1	114.3	107.6	119.1
1989	95.7	94.0	94.8	135.1	104.0	108.6	103.5	120.4	106.0	122.3
1990	90.0	89.8	91.0	168.6	98.6	111.3	98.6	117.1	102.2	117.7
1991	88.9	89.3	90.6	180.2	93.3	113.1	95.4	115.1	99.6	106.3
1992	89.7	89.9	91.1	176.0	91.0	106.8	97.7	116.8	100.2	103.1

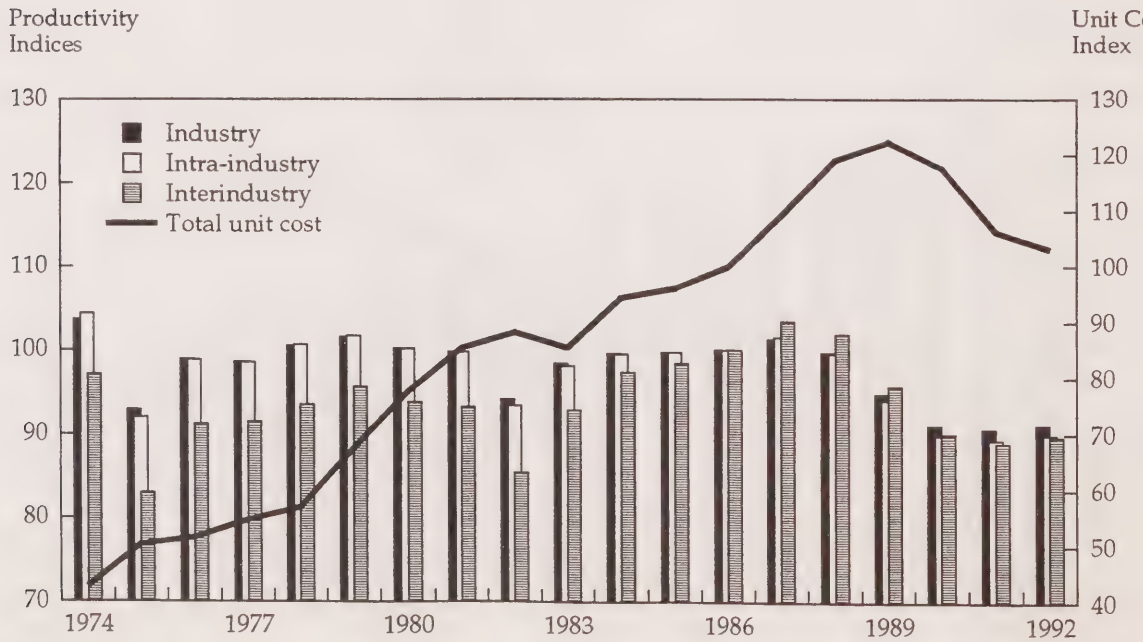


Table 23 - Printing, publishing & allied industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	86.3	88.6	89.3	74.6	81.7	73.9	69.7	39.9	60.6	41.9
1975	84.9	89.7	90.3	74.5	81.6	69.5	68.9	43.1	61.7	46.5
1976	91.5	94.9	95.2	74.6	81.5	69.3	74.5	45.0	67.0	48.6
1977	95.0	98.4	98.5	74.6	79.7	72.4	77.5	46.3	69.9	51.1
1978	97.5	100.5	100.5	74.5	84.1	76.2	84.2	49.4	75.4	54.2
1979	97.9	100.1	100.1	75.4	86.9	76.0	86.6	51.7	77.4	60.2
1980	97.6	100.1	100.1	78.6	92.0	81.6	95.3	55.0	82.7	66.7
1981	98.5	101.1	101.0	85.3	90.5	82.5	97.7	56.8	85.2	74.4
1982	91.7	96.1	96.4	90.0	90.3	78.0	91.1	63.5	81.6	81.7
1983	96.4	98.6	98.7	89.8	89.3	79.3	89.4	70.8	84.3	86.6
1984	100.5	101.4	101.3	89.2	92.5	90.0	94.3	82.4	91.4	91.6
1985	100.7	101.2	101.1	96.2	95.0	91.4	94.5	93.0	95.7	96.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	98.4	97.5	97.7	105.5	103.9	101.5	105.9	102.2	101.9	105.5
1988	98.0	97.1	97.4	111.4	109.7	113.1	117.2	105.0	108.1	111.7
1989	95.3	95.7	96.0	119.3	115.0	108.7	120.0	105.2	110.3	118.3
1990	90.3	92.1	92.7	135.3	116.7	107.5	112.8	103.5	107.3	124.6
1991	85.1	86.8	87.8	153.8	110.0	116.3	103.1	97.7	98.4	128.5
1992	80.5	82.0	83.3	174.4	107.1	111.3	101.2	94.9	93.5	132.9

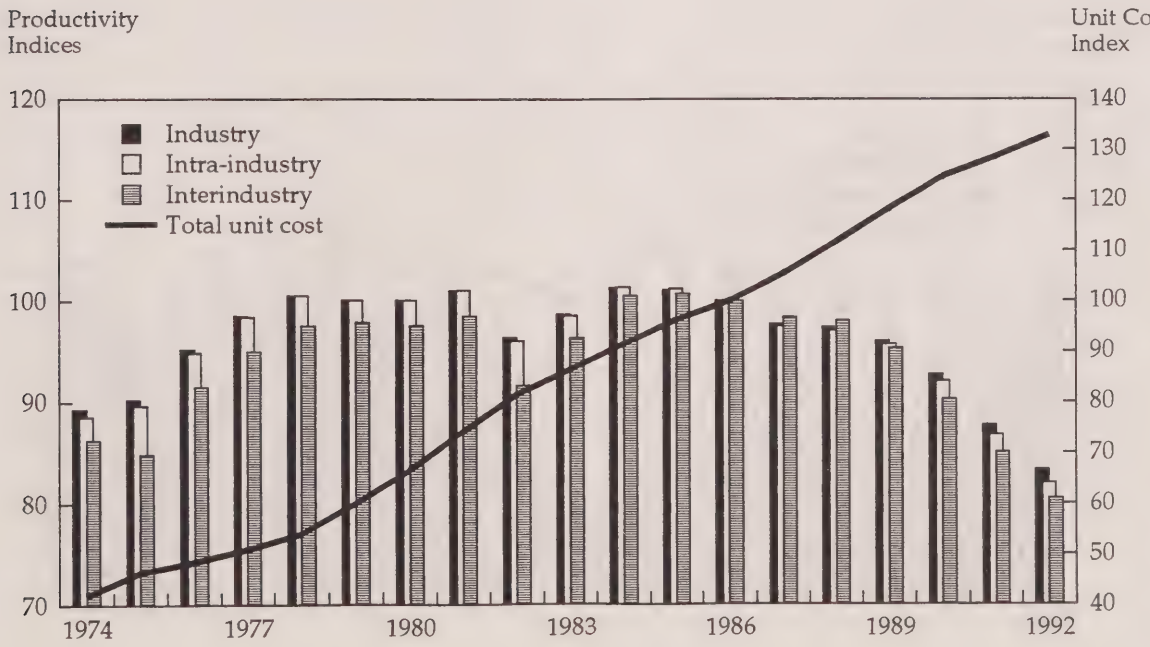


Table 24 - Primary metal industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	91.9	97.6	98.1	75.5	125.6	102.7	98.9	80.3	99.3	44.3
1975	87.3	95.0	95.8	81.6	118.8	97.3	85.3	76.0	88.2	49.7
1976	86.6	92.2	93.3	88.8	115.4	95.6	85.6	75.1	85.9	53.8
1977	88.3	95.7	96.4	89.3	118.1	98.1	82.7	79.5	88.2	58.3
1978	92.9	97.2	97.8	90.4	121.2	107.4	86.9	86.0	93.7	63.8
1979	87.7	93.0	94.1	88.0	127.1	107.1	92.8	94.7	95.2	78.4
1980	86.6	90.7	92.1	87.6	129.7	114.2	103.1	100.6	99.6	89.4
1981	84.3	93.9	94.9	93.6	124.2	109.0	98.6	97.1	99.3	91.4
1982	80.1	88.0	89.7	103.8	111.3	90.9	81.2	82.8	80.4	91.7
1983	86.8	93.5	94.5	104.9	103.4	90.9	87.4	84.6	86.7	95.1
1984	96.9	97.4	97.8	97.3	110.0	99.9	101.4	95.2	99.8	99.4
1985	100.7	101.1	100.9	95.5	102.8	97.8	103.2	98.3	102.5	98.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	107.5	102.7	102.3	105.5	101.0	107.0	107.1	110.0	108.3	105.3
1988	108.9	102.6	102.2	107.5	107.1	118.2	110.3	118.3	112.9	124.1
1989	104.9	102.6	102.2	111.0	103.2	120.2	110.9	125.4	113.9	125.2
1990	100.9	99.7	99.7	121.8	96.5	115.5	103.1	111.4	104.4	113.3
1991	102.7	100.3	100.2	132.8	91.8	128.8	104.0	111.6	105.2	103.1
1992	105.6	101.6	101.4	134.7	88.8	133.2	106.6	112.3	107.5	100.8

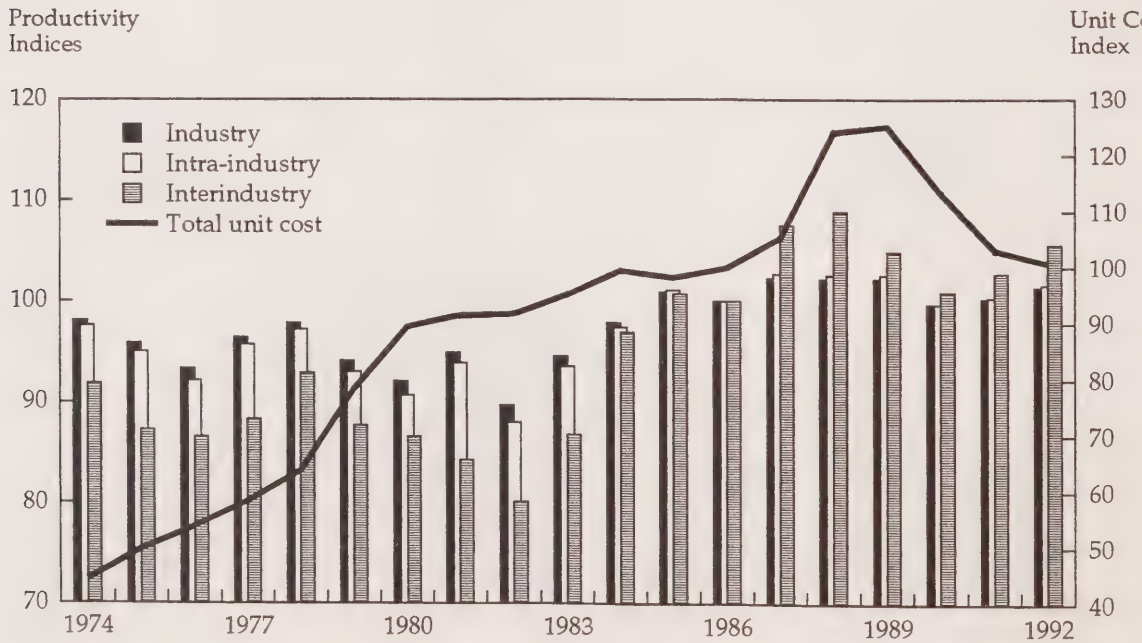


Table 25 - Fabricated metal products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	97.0	97.4	97.5	93.4	108.7	103.2	93.5	84.3	93.9	43.6
1975	91.3	93.5	94.0	97.2	107.2	97.8	85.9	82.4	87.1	49.4
1976	93.4	95.6	95.8	98.7	108.4	100.6	89.1	85.0	91.1	53.0
1977	94.5	96.2	96.4	97.4	105.2	102.6	85.8	84.5	89.2	56.6
1978	95.0	96.5	96.7	95.4	108.6	102.8	90.3	89.5	92.8	61.9
1979	92.6	93.8	94.2	93.8	111.5	108.0	108.6	94.5	99.9	70.2
1980	92.3	95.0	95.3	97.0	110.2	110.0	102.8	93.6	98.4	79.8
1981	94.0	96.9	97.1	105.7	107.3	102.1	97.9	91.4	97.8	83.9
1982	88.7	94.7	95.0	107.1	94.2	89.8	86.5	81.3	85.8	88.3
1983	93.3	96.3	96.5	99.2	86.5	87.3	78.6	78.0	80.3	91.6
1984	99.7	99.8	99.8	90.6	87.1	94.3	84.7	83.4	85.9	94.5
1985	102.4	101.4	101.3	93.4	95.1	95.2	96.9	93.0	96.6	97.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.0	99.4	99.4	109.6	106.6	109.3	111.1	103.4	107.9	103.8
1988	99.0	98.9	99.0	109.7	114.7	121.9	111.7	111.0	111.1	108.0
1989	98.8	98.9	98.9	108.0	121.0	124.9	116.1	115.3	115.2	111.0
1990	97.4	99.1	99.2	105.2	111.6	123.6	104.5	104.7	105.9	111.7
1991	94.9	97.1	97.3	98.7	103.1	129.8	93.2	98.0	95.2	111.3
1992	97.0	99.3	99.4	94.9	91.8	117.2	90.2	93.0	91.0	109.7

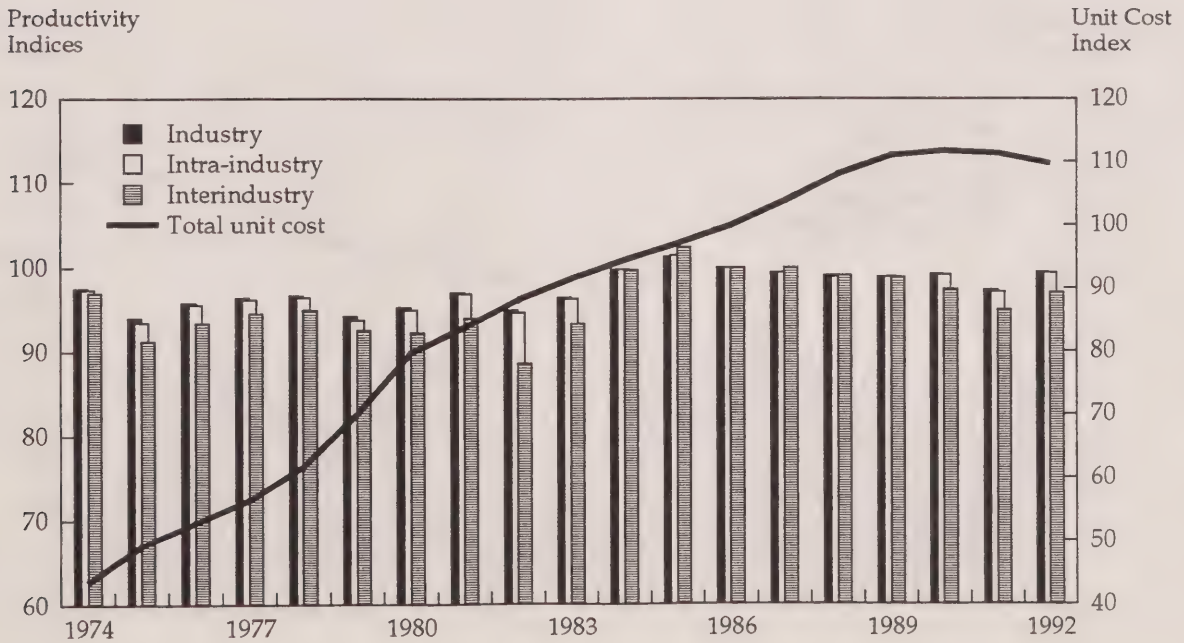


Table 26 - Machinery industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	98.6	99.4	99.4	72.8	101.8	95.1	96.7	90.4	94.1	38.7
1975	93.5	95.9	96.1	78.8	108.3	96.5	97.4	98.9	94.9	44.9
1976	94.8	96.5	96.6	85.5	104.7	102.4	90.9	97.6	92.4	48.3
1977	97.1	98.5	98.5	88.3	102.5	104.3	91.8	94.9	94.0	51.7
1978	98.8	100.4	100.4	86.9	105.9	109.9	95.9	99.3	99.0	57.1
1979	102.8	104.1	103.8	86.9	114.5	112.6	115.3	111.4	115.1	64.0
1980	100.7	102.6	102.5	91.0	120.6	120.0	119.3	115.6	118.4	72.2
1981	98.9	100.2	100.2	103.6	117.0	113.8	115.5	111.9	114.8	81.1
1982	88.8	92.1	92.6	111.4	98.2	99.0	88.4	87.6	87.6	89.6
1983	88.8	90.7	91.2	113.7	87.4	89.5	74.8	78.5	76.5	91.3
1984	97.2	98.0	98.1	107.0	92.6	101.0	86.9	87.9	89.8	95.1
1985	99.4	99.4	99.5	99.6	95.2	100.9	92.8	95.7	94.4	97.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	98.0	97.4	97.6	98.4	106.7	113.6	107.6	108.1	103.7	101.5
1988	99.9	99.0	99.1	96.9	116.9	117.5	119.8	123.1	115.1	107.2
1989	98.9	98.0	98.1	100.9	120.6	120.2	126.1	133.6	119.6	112.0
1990	96.4	96.3	96.5	109.0	109.8	119.3	115.2	129.3	110.8	115.1
1991	89.8	90.1	90.5	116.8	99.4	128.3	97.6	108.2	92.7	116.6
1992	88.5	88.5	89.0	119.4	94.5	121.3	96.0	102.9	88.5	120.0

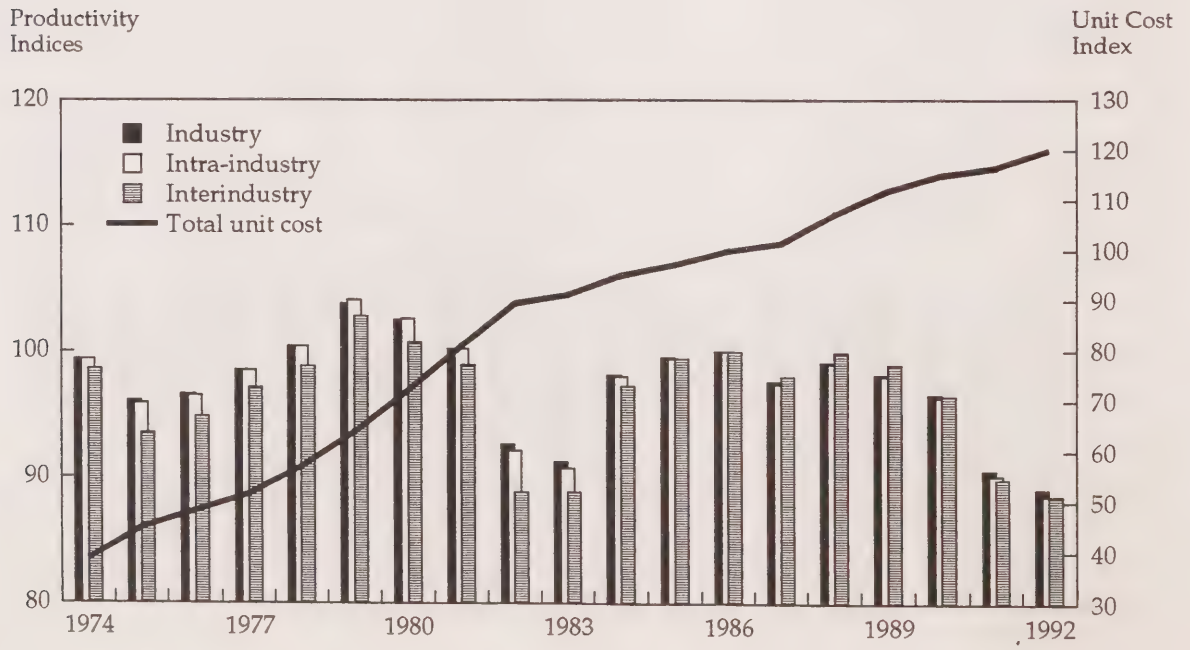


Table 27 - Transportation equipment industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	93.3	94.9	95.3	51.1	83.5	85.9	69.0	69.0	68.8	36.2
1975	94.1	96.8	97.1	54.5	77.9	78.7	65.4	63.7	66.8	40.3
1976	95.9	98.2	98.4	54.3	80.3	81.2	72.6	68.8	73.1	43.3
1977	96.9	98.9	99.1	51.2	83.1	86.1	75.9	71.8	76.2	47.7
1978	97.2	99.2	99.4	52.5	85.9	83.4	80.1	77.5	80.3	53.4
1979	97.4	99.0	99.2	56.2	88.7	84.9	77.3	84.7	80.2	58.9
1980	91.3	93.1	93.6	67.0	82.5	82.6	66.9	80.6	68.5	65.8
1981	92.9	94.5	94.9	100.5	83.2	82.0	64.4	81.1	69.4	75.0
1982	90.5	93.5	94.0	111.8	74.9	76.4	62.1	76.8	65.6	81.3
1983	94.6	96.3	96.6	104.8	78.1	81.1	75.7	75.8	76.1	85.4
1984	99.6	100.1	100.1	102.6	90.8	92.6	95.5	95.7	95.5	90.4
1985	101.1	101.2	101.2	95.2	98.2	94.5	102.5	100.1	101.9	95.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	98.8	98.3	98.4	112.7	102.7	105.3	97.8	93.3	97.6	100.0
1988	100.8	100.0	100.0	132.5	107.9	116.2	124.0	108.5	119.5	99.0
1989	101.2	100.6	100.5	148.4	107.8	120.5	126.6	107.9	122.9	101.7
1990	98.5	98.8	99.0	153.7	100.2	118.0	118.2	101.4	114.1	103.6
1991	97.4	98.1	98.3	145.7	91.1	115.9	110.1	88.6	104.5	106.9
1992	97.1	97.3	97.6	141.7	94.1	119.0	116.8	87.7	108.0	112.2

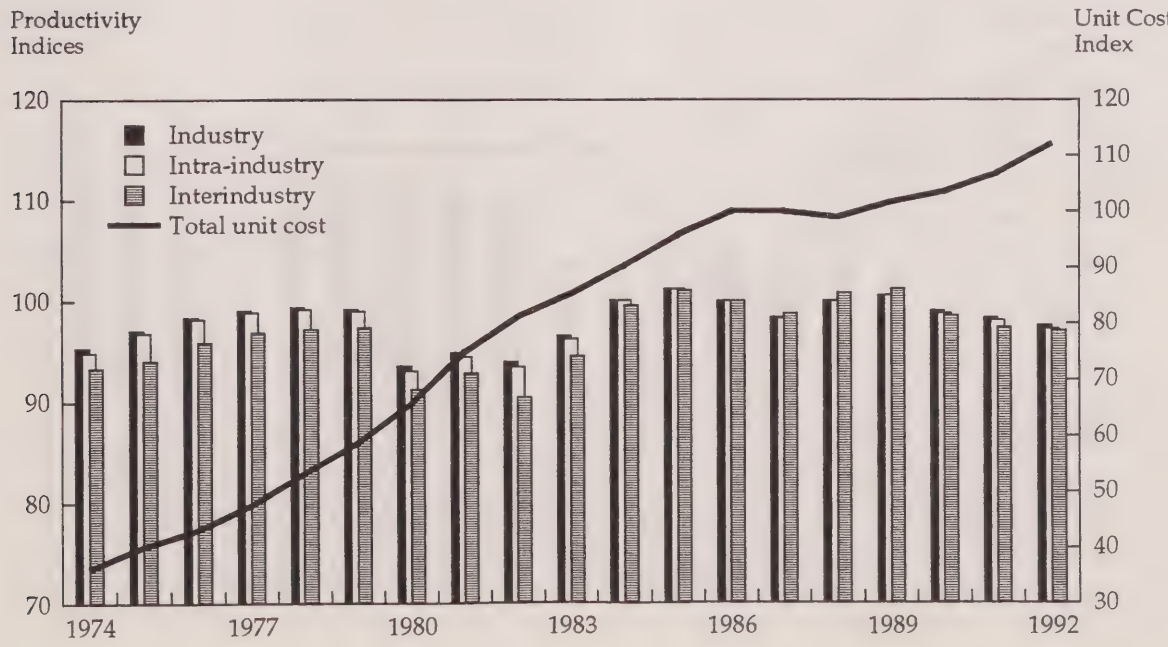


Table 28 - Electrical & electronic products industries (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	73.5	77.8	79.4	59.6	110.3	92.4	61.3	76.2	59.6	58.0
1975	71.4	76.3	78.0	60.6	102.9	92.0	54.7	70.5	54.1	64.6
1976	75.3	79.7	81.2	60.1	99.0	92.4	55.4	71.3	55.9	67.2
1977	78.2	82.8	84.0	59.1	90.3	90.5	52.7	69.2	54.7	70.1
1978	77.2	81.9	83.2	57.1	93.1	88.1	56.8	72.4	56.5	75.6
1979	84.9	88.3	89.2	54.6	98.3	90.8	64.0	80.3	65.4	82.5
1980	89.6	92.2	92.8	55.3	101.1	95.6	67.3	85.3	70.7	87.3
1981	90.9	93.4	93.9	62.2	106.9	101.8	75.9	90.5	78.5	92.7
1982	87.0	89.8	90.5	71.7	98.8	88.9	64.7	78.4	69.3	99.5
1983	88.1	90.0	90.7	77.1	94.7	86.3	67.2	78.0	70.3	101.1
1984	96.8	96.8	97.1	85.5	99.9	97.9	80.1	90.9	85.1	100.0
1985	98.4	98.5	98.6	94.2	102.9	99.1	92.5	96.0	94.7	100.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	101.7	101.0	100.9	106.4	107.6	105.5	113.0	108.7	111.1	100.3
1988	104.5	103.5	103.2	113.6	111.9	106.5	134.6	120.7	127.1	100.9
1989	106.6	105.2	104.8	119.1	113.4	106.0	148.9	119.9	136.6	101.5
1990	107.6	106.6	106.1	123.0	106.5	106.9	161.1	118.0	141.8	100.0
1991	106.8	105.2	104.8	124.1	98.1	103.7	165.9	117.6	139.3	97.3
1992	109.5	107.5	106.9	119.7	97.1	107.2	179.2	120.0	147.2	94.2

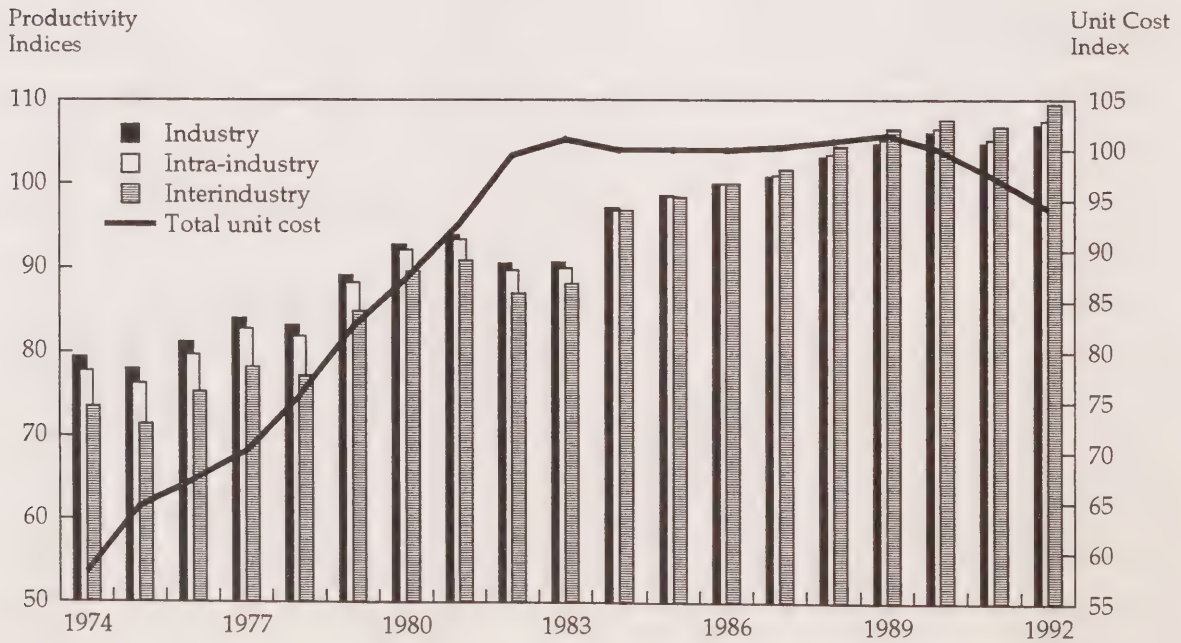


Table 29 - Non-metallic mineral products industries(1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	93.0	96.0	96.2	120.2	113.5	129.4	89.1	89.2	98.8	36.1
1975	90.2	92.9	93.5	126.8	110.8	114.7	85.9	87.2	94.4	42.4
1976	93.2	94.2	94.6	129.2	108.6	116.7	87.6	87.6	96.1	46.5
1977	91.6	93.2	93.8	133.3	104.2	115.0	87.6	85.8	94.3	50.2
1978	94.4	94.9	95.3	137.7	106.8	123.0	91.0	91.6	99.7	54.3
1979	95.6	95.5	95.8	140.5	108.6	136.2	97.9	98.3	105.3	59.3
1980	88.3	89.7	90.6	149.5	104.6	122.5	92.1	93.9	96.2	66.6
1981	86.6	89.2	90.2	148.6	103.6	112.5	90.9	93.9	94.4	76.9
1982	79.0	83.3	84.9	145.8	89.0	91.1	74.8	80.5	76.1	86.5
1983	87.2	89.0	90.1	128.9	88.7	87.3	77.5	79.0	79.8	90.2
1984	94.1	93.9	94.5	113.6	91.7	93.5	82.9	84.4	86.0	92.5
1985	97.5	98.3	98.4	104.1	94.6	93.1	89.3	92.2	92.5	95.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.9	102.1	101.9	102.3	107.6	99.8	111.3	107.3	109.2	103.8
1988	105.9	101.9	101.8	105.6	110.0	108.8	108.8	112.4	110.9	107.7
1989	102.2	99.3	99.3	114.2	109.4	102.8	113.1	115.1	111.4	109.3
1990	95.5	93.5	94.1	127.1	103.1	102.8	101.7	107.4	101.3	111.7
1991	89.7	87.8	88.9	134.9	92.6	94.0	86.9	94.2	86.7	110.4
1992	93.4	89.9	90.8	126.4	85.2	89.2	82.5	88.8	83.0	110.2

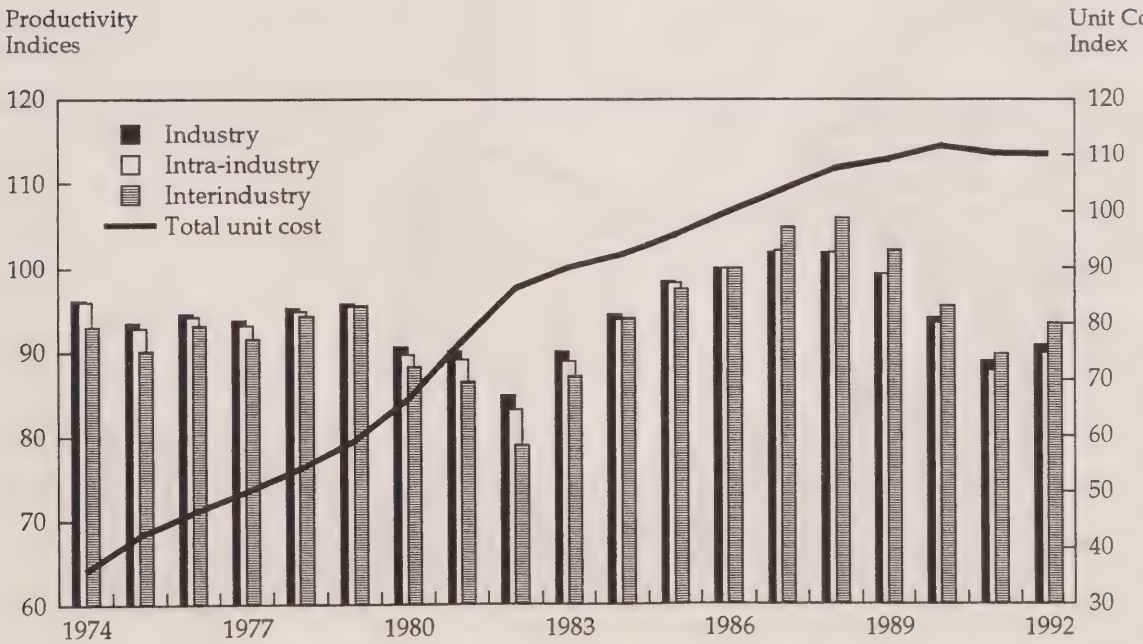


Table 30 - Refined petroleum & coal products (1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	131.5	95.6	95.7	94.4	113.2	56.3	120.3	82.8	111.2	35.8
1975	125.5	96.3	96.4	103.8	108.4	61.2	116.7	82.4	109.4	45.5
1976	120.5	95.7	95.8	109.3	107.0	63.8	118.1	86.8	110.5	47.8
1977	122.0	98.8	98.8	107.9	113.7	73.0	123.6	95.7	119.8	52.8
1978	113.6	96.5	96.6	106.4	131.1	75.2	125.8	94.8	119.5	59.1
1979	114.6	95.2	95.3	101.9	122.2	85.4	135.4	108.0	126.6	71.1
1980	106.8	95.6	95.7	95.6	125.9	81.3	131.7	111.4	124.3	97.3
1981	103.0	97.8	97.8	91.0	146.9	86.5	124.6	109.4	121.3	133.8
1982	101.5	100.2	100.1	100.5	137.5	78.3	102.8	99.2	103.9	151.8
1983	103.5	101.6	101.5	115.6	126.5	88.7	99.3	99.3	102.7	158.8
1984	105.2	102.2	102.1	118.1	116.1	97.4	99.7	106.6	103.9	165.7
1985	104.6	101.1	101.0	109.8	114.8	117.5	98.3	101.2	101.1	158.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.8	100.8	100.7	92.8	100.5	114.4	104.6	104.8	104.8	104.0
1988	110.6	101.1	101.1	92.7	100.4	110.5	104.8	105.2	105.2	90.4
1989	109.4	100.9	100.8	92.7	111.0	123.6	105.5	100.8	105.8	96.3
1990	110.8	101.3	101.2	97.9	100.2	120.5	107.3	99.7	106.9	114.6
1991	112.0	100.9	100.8	102.8	92.4	229.5	102.8	96.7	103.4	109.1
1992	115.0	101.0	101.0	105.9	87.1	106.6	104.0	89.9	102.4	103.1

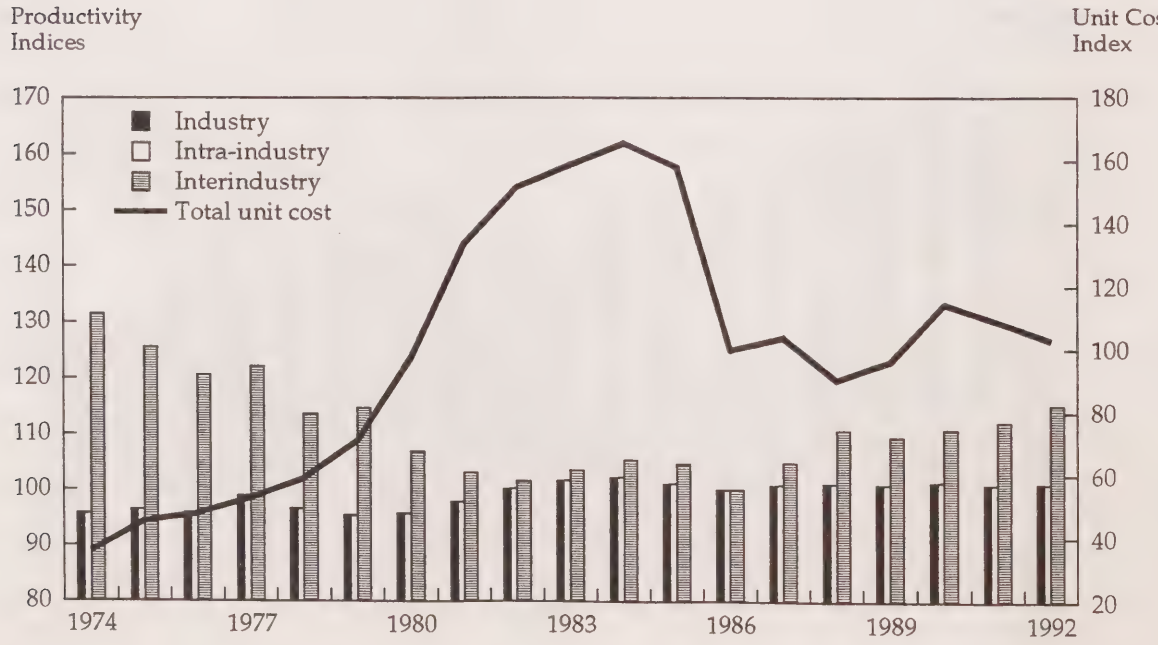


Table 31 - Chemical & chemical products industries(1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	90.0	88.0	89.9	52.8	94.9	65.5	58.5	63.2	57.5	44.5
1975	84.2	82.3	84.9	57.3	95.7	57.2	56.1	62.0	53.8	52.1
1976	88.5	86.3	88.4	64.2	90.4	62.5	57.2	63.3	57.1	54.6
1977	89.4	85.9	88.1	71.3	98.0	64.4	61.5	66.2	61.2	57.3
1978	91.5	88.7	90.5	77.2	100.0	70.9	71.2	72.7	69.6	61.1
1979	94.0	91.0	92.5	82.0	101.9	76.5	81.7	80.2	78.2	70.1
1980	90.2	88.2	90.1	84.0	101.0	82.8	85.6	86.4	79.3	81.6
1981	93.8	91.7	93.0	84.6	103.6	89.3	85.5	87.6	82.6	93.3
1982	87.0	86.1	88.4	98.2	101.4	74.4	80.2	82.5	75.8	99.0
1983	93.7	94.3	95.3	111.4	101.0	80.3	84.7	87.4	87.0	96.4
1984	98.1	98.0	98.4	109.2	101.6	96.6	90.1	93.0	94.2	99.3
1985	100.1	99.4	99.5	103.7	100.0	99.0	96.1	96.0	97.7	101.5
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	102.8	102.1	101.8	101.5	101.3	97.9	105.7	102.6	105.1	103.4
1988	104.6	104.1	103.3	101.9	108.3	89.6	102.5	108.2	107.2	114.9
1989	105.9	106.0	105.0	101.5	108.8	97.1	104.6	107.1	109.8	117.5
1990	103.5	104.5	103.7	107.1	109.2	101.2	105.2	102.4	109.5	115.5
1991	98.4	99.4	99.4	114.6	105.0	94.3	95.7	97.7	100.7	115.5
1992	98.6	99.5	99.5	121.5	105.0	88.4	100.5	98.5	104.0	113.7

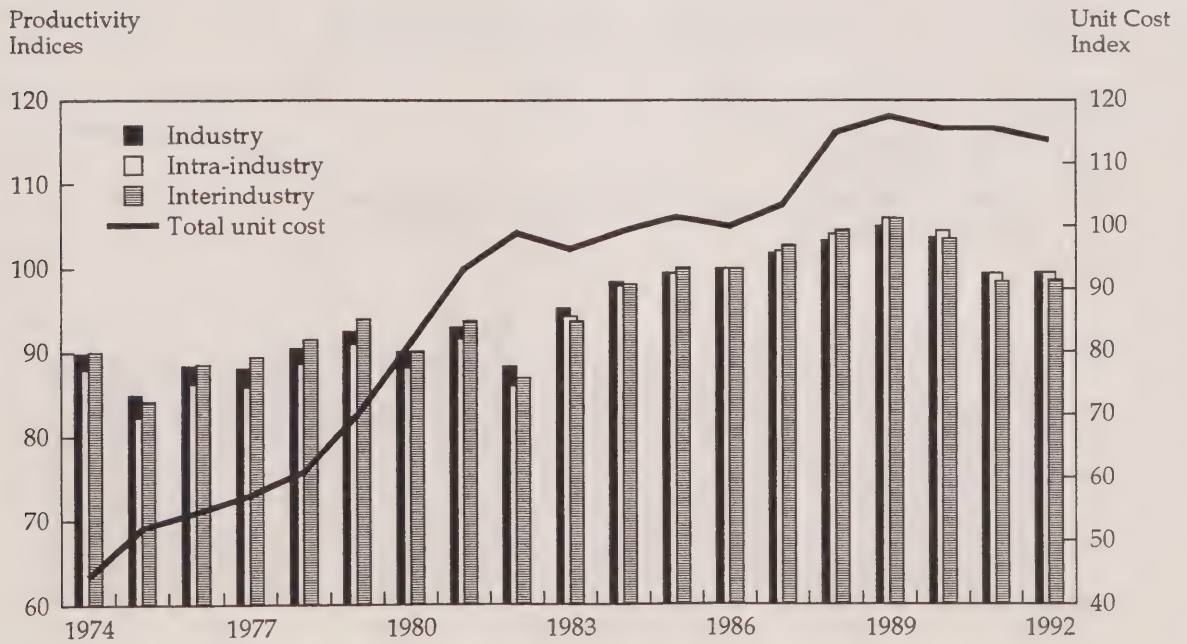
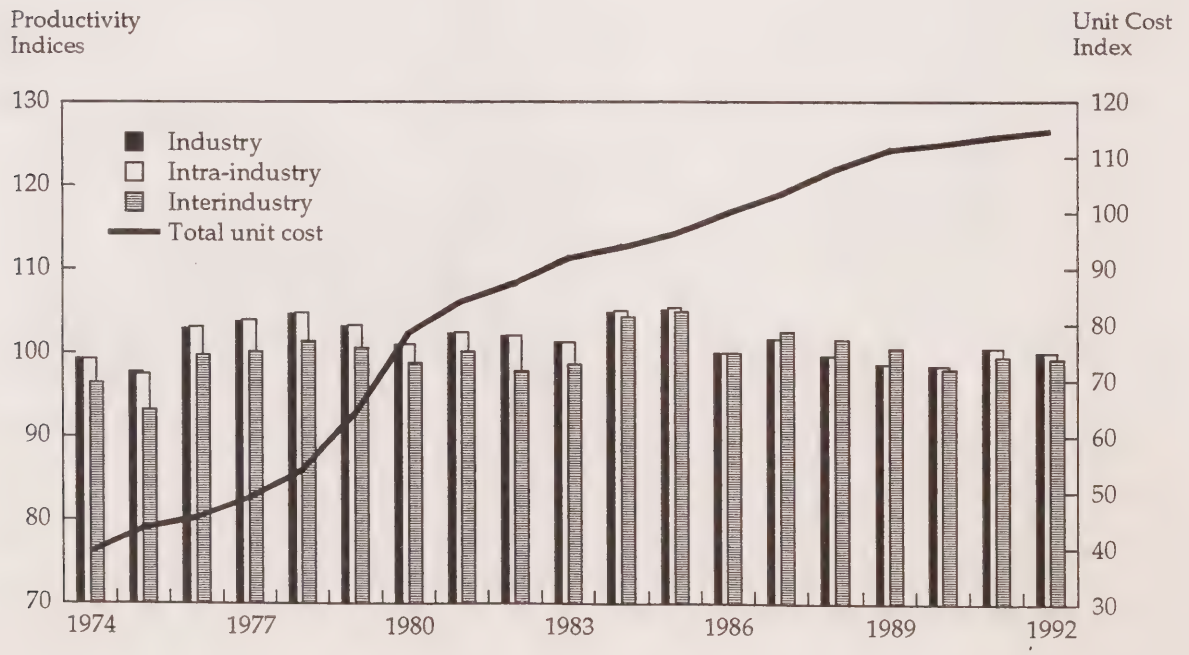


Table 32 - Other manufacturing industries(1986=100)

Year	Productivity			KLEMS inputs					Gross output	Total unit cost
	Inter-industry	Intra-industry	Industry	Capital	Labour	Energy	Raw material	Services		
1974	96.4	99.3	99.3	72.8	97.6	88.8	91.5	74.2	88.1	39.2
1975	93.2	97.5	97.7	77.1	97.2	81.1	86.0	71.3	84.2	43.5
1976	99.7	103.1	102.9	75.4	97.5	85.1	91.2	75.7	91.5	45.4
1977	100.1	103.9	103.7	76.7	91.2	82.2	89.0	74.7	89.5	49.0
1978	101.4	104.8	104.6	74.4	93.2	86.2	98.7	84.7	96.5	53.9
1979	100.6	103.3	103.1	77.4	95.7	86.5	94.8	86.5	94.9	64.1
1980	98.8	101.0	100.9	78.8	95.0	90.2	84.1	90.3	88.6	78.5
1981	100.1	102.4	102.3	85.4	98.6	91.1	86.9	92.1	93.0	84.2
1982	97.8	102.1	102.0	86.8	90.9	80.4	81.5	85.8	87.2	87.5
1983	98.6	101.2	101.2	85.7	90.6	82.8	81.4	83.0	85.8	91.9
1984	104.2	105.0	104.8	88.0	94.2	95.5	89.2	91.2	95.3	93.9
1985	104.9	105.4	105.1	91.4	98.1	88.4	95.6	94.3	100.4	96.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	102.5	101.6	101.6	114.0	98.2	100.5	98.4	97.1	101.0	103.4
1988	101.5	99.6	99.6	128.7	105.6	99.7	103.7	101.6	105.4	107.8
1989	100.5	98.6	98.6	130.1	110.6	96.4	105.4	96.6	105.7	111.3
1990	98.0	98.4	98.4	136.9	108.9	101.9	99.2	91.1	102.1	112.3
1991	99.4	100.5	100.5	138.7	100.8	111.3	95.8	89.3	100.1	113.6
1992	99.2	100.0	100.0	143.9	96.4	95.7	90.8	85.9	96.0	114.7



PART 2

Labour Productivity

Labour Compensation

Unit Labour Cost

Table 1 - Business sector industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	69.0	79.0	106.1	83.9	30.7	82.2	38.9	36.7	44.6
1975	69.3	80.2	105.5	84.6	35.4	81.9	44.1	41.8	51.0
1976	74.0	81.5	104.6	85.3	40.7	86.8	50.0	47.7	55.0
1977	76.4	83.3	103.1	85.9	45.1	89.0	54.2	52.6	59.1
1978	78.9	85.9	103.5	88.8	49.2	88.9	57.3	55.3	62.3
1979	82.4	89.5	102.9	92.1	55.5	89.5	62.0	60.3	67.3
1980	83.8	91.4	102.2	93.4	62.7	89.8	68.6	67.2	74.8
1981	87.5	94.2	101.3	95.4	72.4	91.6	76.8	75.8	82.7
1982	82.6	91.3	99.5	90.9	75.8	90.9	83.0	83.4	91.8
1983	85.5	91.3	99.0	90.3	79.1	94.6	86.6	87.5	92.5
1984	91.5	93.7	99.7	93.4	85.9	98.0	91.7	92.0	93.9
1985	96.6	98.1	100.0	98.1	93.6	98.5	95.5	95.5	96.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.0	103.2	100.6	103.8	110.0	101.1	106.6	105.9	104.8
1988	110.1	107.2	100.8	108.1	121.7	101.9	113.5	112.6	110.5
1989	112.8	109.6	100.0	109.6	131.6	102.9	120.1	120.1	116.7
1990	111.1	109.9	99.9	109.7	137.2	101.3	124.9	125.0	123.5
1991	107.6	106.6	98.6	105.1	139.0	102.4	130.4	132.2	129.2
1992	107.8	105.3	98.5	103.6	141.3	104.1	134.2	136.3	131.0
1993	111.3	106.9	99.0	105.8	144.3	105.2	135.0	136.4	129.7
1994	117.3	109.5	99.7	109.2	151.1	107.5	138.0	138.4	128.8

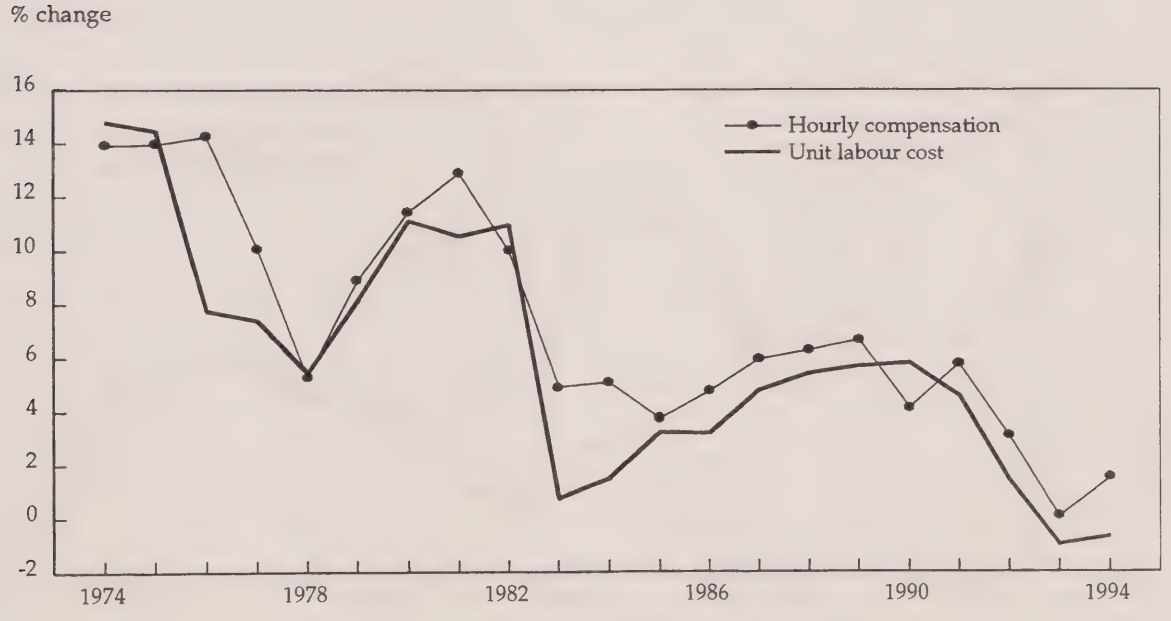


Table 2 - Business sector-excluding agricultural & related services industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compen-sation	Real GDP per hour worked	Compen-sation per person	Hourly compen-sation	Unit labour unit
1974	68.9	78.1	105.1	82.1	30.6	84.0	39.2	37.3	44.4
1975	68.9	79.0	104.3	82.3	35.2	83.7	44.6	42.8	51.1
1976	73.6	80.5	103.6	83.4	40.7	88.3	50.5	48.8	55.3
1977	76.1	82.5	102.3	84.4	45.1	90.1	54.7	53.4	59.3
1978	78.8	85.0	103.0	87.6	49.1	90.0	57.7	56.0	62.3
1979	82.6	88.8	102.3	90.8	55.5	90.9	62.5	61.1	67.2
1980	83.9	90.9	101.9	92.6	62.8	90.6	69.1	67.8	74.9
1981	87.4	93.8	101.0	94.7	72.3	92.3	77.1	76.3	82.7
1982	82.0	90.9	99.1	90.1	75.7	91.0	83.2	84.0	92.3
1983	85.2	90.6	98.8	89.5	79.0	95.2	87.1	88.2	92.7
1984	91.6	93.2	99.6	92.8	85.9	98.7	92.1	92.5	93.7
1985	97.1	97.9	99.9	97.7	93.5	99.4	95.6	95.7	96.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.5	103.5	100.7	104.3	110.3	101.1	106.5	105.7	104.5
1988	111.0	108.0	101.2	109.2	122.0	101.6	113.0	111.7	109.9
1989	113.4	110.6	100.4	111.0	132.1	102.2	119.4	119.0	116.4
1990	111.6	111.0	100.1	111.1	137.7	100.4	124.1	123.9	123.4
1991	108.0	107.4	98.8	106.1	139.4	101.8	129.8	131.4	129.1
1992	108.4	106.1	98.7	104.7	141.7	103.5	133.5	135.3	130.7
1993	111.7	107.7	99.3	107.0	144.7	104.5	134.3	135.3	129.5
1994	117.9	110.5	100.0	110.6	151.7	106.6	137.2	137.2	128.7

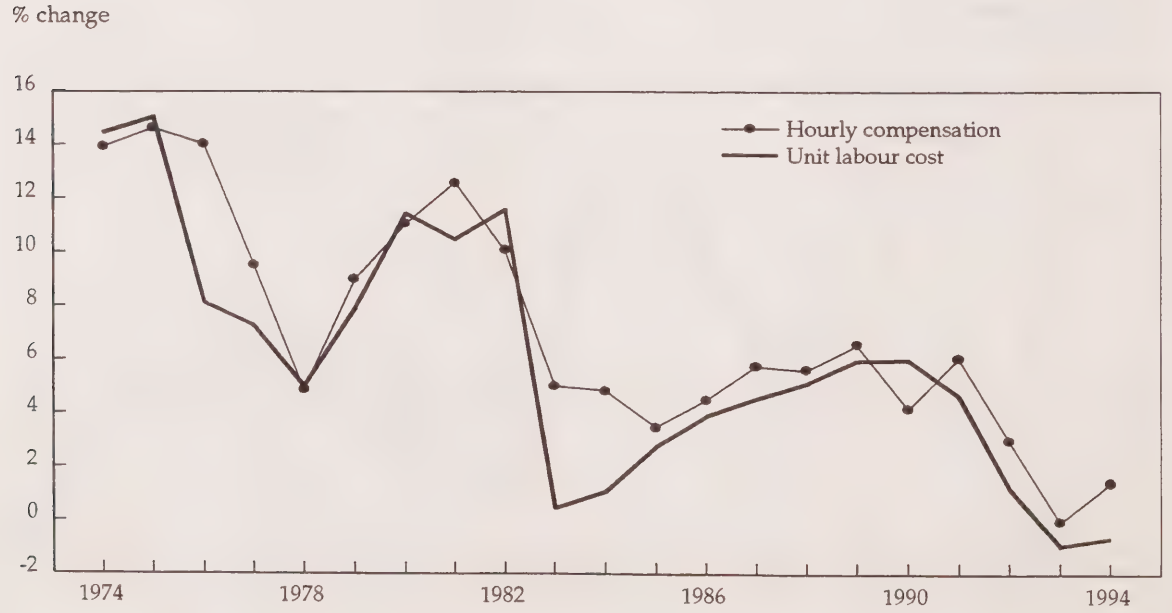


Table 3 - Business sector-services (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	61.8	67.7	105.9	71.7	27.4	86.1	40.4	38.1	44.3
1975	64.4	70.1	105.3	73.8	32.0	87.2	45.6	43.3	49.7
1976	68.0	71.6	104.3	74.7	37.0	91.0	51.6	49.4	54.4
1977	70.0	74.9	102.6	76.9	41.2	91.1	55.0	53.6	58.9
1978	73.7	78.1	103.5	80.8	45.2	91.2	57.9	55.9	61.3
1979	77.9	81.7	102.6	83.8	51.4	92.9	63.0	61.4	66.0
1980	81.3	84.9	102.2	86.8	59.0	93.7	69.5	68.0	72.5
1981	84.8	88.9	101.3	90.0	67.5	94.2	76.0	75.0	79.6
1982	81.0	88.5	99.7	88.2	73.3	91.9	82.9	83.1	90.5
1983	83.3	89.1	98.6	87.9	77.2	94.8	86.6	87.8	92.6
1984	89.2	92.3	99.3	91.7	84.9	97.3	91.9	92.6	95.2
1985	94.6	97.6	99.6	97.2	93.0	97.4	95.3	95.7	98.3
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.8	103.6	100.3	104.0	111.1	101.8	107.2	106.8	105.0
1988	111.6	107.7	100.6	108.3	122.7	103.0	114.0	113.3	110.0
1989	115.2	110.5	99.8	110.3	134.5	104.5	121.7	121.9	116.7
1990	114.4	112.7	100.0	112.6	142.4	101.6	126.4	126.4	124.4
1991	112.4	110.9	98.5	109.3	147.3	102.9	132.8	134.7	131.0
1992	113.5	110.9	98.5	109.3	151.8	103.9	136.8	138.9	133.7
1993	116.7	113.5	98.6	112.0	155.7	104.2	137.1	139.0	133.4
1994	122.4	116.5	99.0	115.4	162.5	106.1	139.5	140.9	132.8

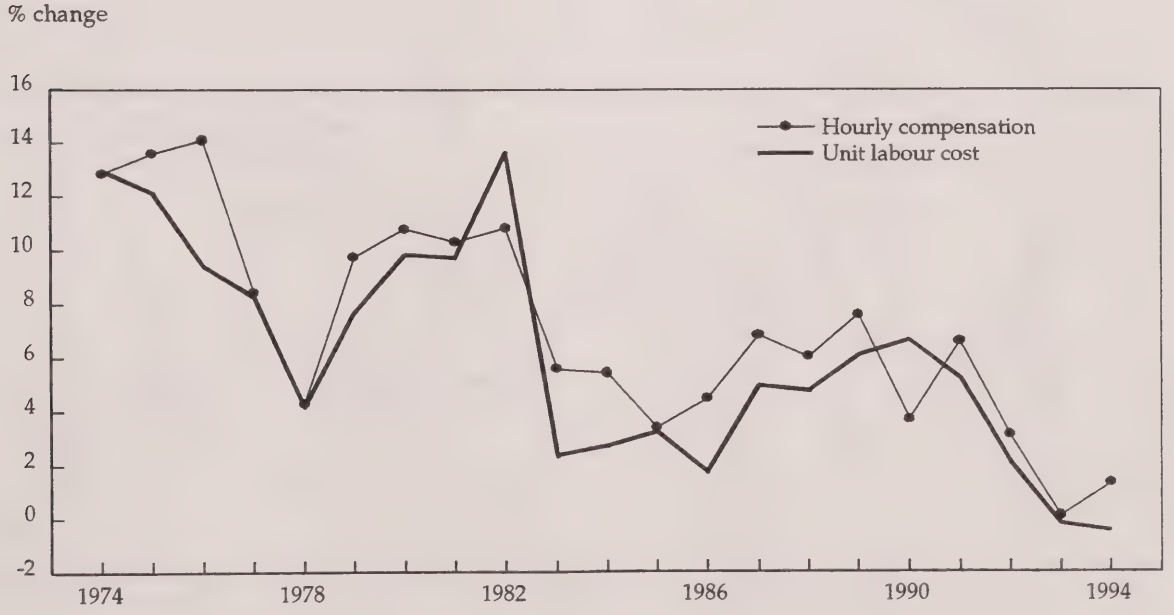


Table 4 - Business sector-goods (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	77.0	96.9	104.4	101.2	35.1	76.1	36.2	34.7	45.6
1975	74.6	96.3	103.9	100.0	39.7	74.6	41.2	39.7	53.2
1976	80.6	97.1	103.3	100.3	45.5	80.4	46.9	45.4	56.4
1977	83.5	96.7	102.1	98.8	50.2	84.5	51.9	50.8	60.1
1978	84.6	98.1	102.2	100.3	54.3	84.3	55.3	54.1	64.1
1979	87.3	101.9	102.1	104.0	60.7	83.9	59.6	58.4	69.6
1980	86.2	101.8	101.1	102.9	67.5	83.8	66.4	65.6	78.3
1981	90.0	102.7	100.4	103.2	78.5	87.2	76.5	76.1	87.3
1982	84.0	95.9	98.8	94.7	79.0	88.8	82.4	83.4	94.0
1983	87.6	94.6	99.1	93.8	81.5	93.3	86.2	86.9	93.1
1984	93.7	95.8	100.0	95.8	87.3	97.8	91.1	91.1	93.1
1985	98.5	98.8	100.6	99.4	94.5	99.1	95.6	95.0	95.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.1	102.6	101.0	103.6	108.6	100.4	105.9	104.8	104.4
1988	108.6	106.6	101.1	107.7	120.4	100.9	113.0	111.8	110.8
1989	110.1	108.1	100.5	108.6	128.0	101.4	118.5	117.9	116.3
1990	107.6	105.4	100.2	105.6	130.6	101.9	123.9	123.7	121.4
1991	102.4	99.6	99.5	99.1	128.4	103.3	128.9	129.6	125.4
1992	101.8	96.3	99.3	95.6	127.8	106.5	132.7	133.7	125.6
1993	105.5	96.3	100.7	97.0	129.7	108.8	134.7	133.8	123.0
1994	112.0	98.5	101.8	100.3	136.5	111.6	138.7	136.2	122.0

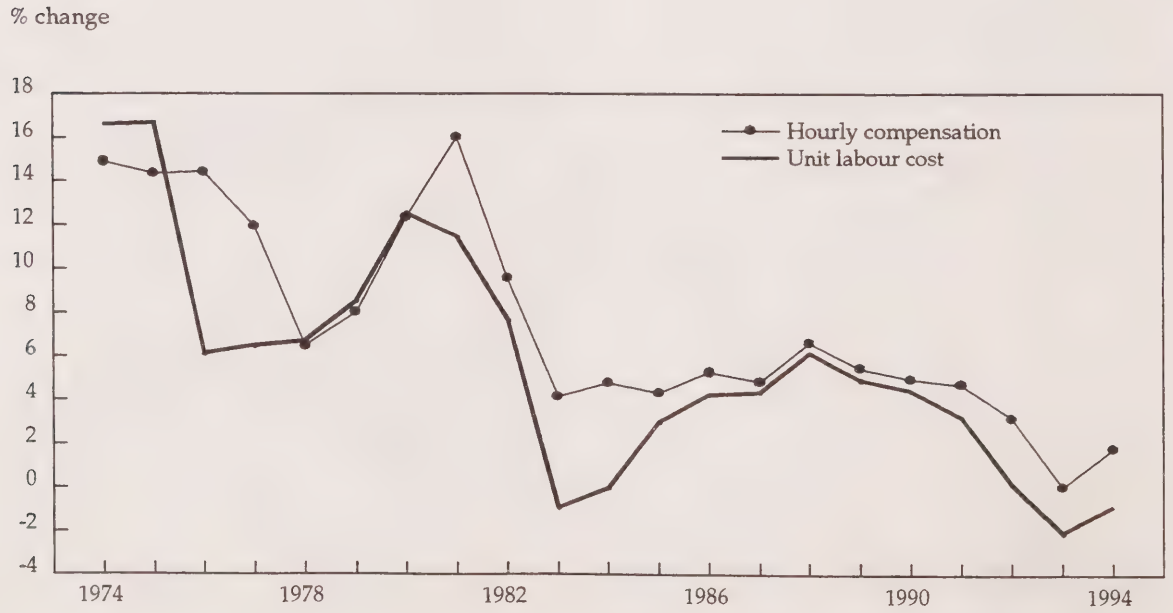


Table 5 - Agricultural & related services industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	69.6	94.1	114.2	107.5	35.3	64.8	37.6	32.9	50.8
1975	81.3	100.3	114.1	114.5	40.1	71.0	40.0	35.0	49.3
1976	88.5	97.9	112.7	110.3	41.8	80.2	42.7	37.9	47.3
1977	87.5	96.8	108.5	105.0	46.1	83.3	47.6	43.9	52.6
1978	83.8	99.1	106.8	105.8	53.5	79.2	54.0	50.6	63.9
1979	77.0	100.8	107.8	108.7	56.9	70.8	56.4	52.4	73.9
1980	81.5	100.3	103.6	103.9	60.3	78.5	60.2	58.0	74.0
1981	88.9	101.9	103.2	105.2	75.3	84.5	73.9	71.6	84.8
1982	94.5	97.5	103.6	101.0	80.0	93.5	82.1	79.2	84.7
1983	91.7	101.7	99.4	101.1	82.9	90.7	81.5	82.0	90.4
1984	88.8	101.5	99.4	100.9	88.6	88.0	87.3	87.8	99.8
1985	85.1	101.4	101.7	103.2	98.7	82.5	97.3	95.7	116.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	90.1	98.1	99.7	97.9	99.1	92.1	100.9	101.2	109.9
1988	85.5	95.4	97.2	92.7	109.8	92.2	115.2	118.5	128.5
1989	92.5	92.4	98.4	90.9	113.0	101.8	122.3	124.3	122.2
1990	98.0	92.2	99.9	92.1	119.9	106.5	130.0	130.2	122.3
1991	96.9	92.2	99.7	91.9	121.4	105.4	131.7	132.1	125.4
1992	90.7	91.1	98.0	89.3	122.7	101.6	134.7	137.4	135.3
1993	97.2	92.7	97.5	90.4	127.4	107.5	137.5	141.0	131.2
1994	101.8	93.1	97.6	90.9	129.6	112.0	139.2	142.6	127.3

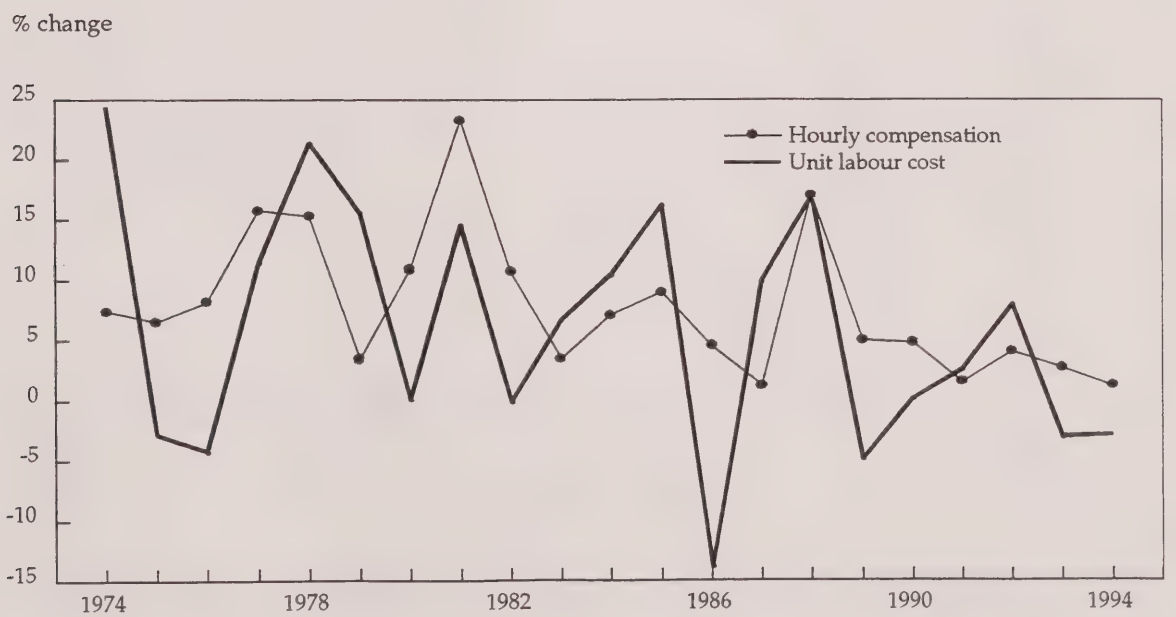


Table 6 - Manufacturing industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	80.5	99.8	101.9	101.7	34.6	79.2	34.7	34.1	43.0
1975	75.1	97.5	100.8	98.3	38.3	76.5	39.3	38.9	50.9
1976	80.6	97.9	100.6	98.6	43.9	81.8	44.8	44.6	54.5
1977	83.6	95.9	100.9	96.8	47.7	86.3	49.8	49.3	57.1
1978	87.4	98.9	101.2	100.1	53.2	87.3	53.7	53.1	60.8
1979	90.6	102.5	100.4	102.9	60.2	88.1	58.7	58.5	66.4
1980	86.6	102.2	100.0	102.2	66.2	84.7	64.8	64.8	76.4
1981	89.8	102.2	98.9	101.0	75.3	88.9	73.7	74.5	83.9
1982	78.2	94.3	97.8	92.2	75.9	84.8	80.6	82.4	97.1
1983	83.2	92.4	99.0	91.5	79.9	91.0	86.6	87.4	96.1
1984	94.0	95.2	100.1	95.2	87.2	98.7	91.6	91.5	92.8
1985	99.3	97.6	100.1	97.7	94.1	101.6	96.4	96.3	94.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.8	103.0	100.8	103.9	107.0	100.9	103.8	103.0	102.0
1988	110.2	107.5	101.0	108.7	116.8	101.4	108.6	107.5	106.1
1989	111.1	108.8	100.3	109.2	121.8	101.8	111.9	111.6	109.6
1990	107.0	103.2	100.2	103.4	121.8	103.5	118.1	117.8	113.8
1991	99.4	95.9	99.7	95.6	119.9	104.0	125.1	125.4	120.6
1992	100.7	92.5	100.9	93.3	120.4	108.0	130.2	129.1	119.6
1993	105.5	93.2	102.4	95.5	124.0	110.6	133.1	129.9	117.5
1994	112.9	95.2	103.0	98.0	131.0	115.2	137.6	133.6	116.0

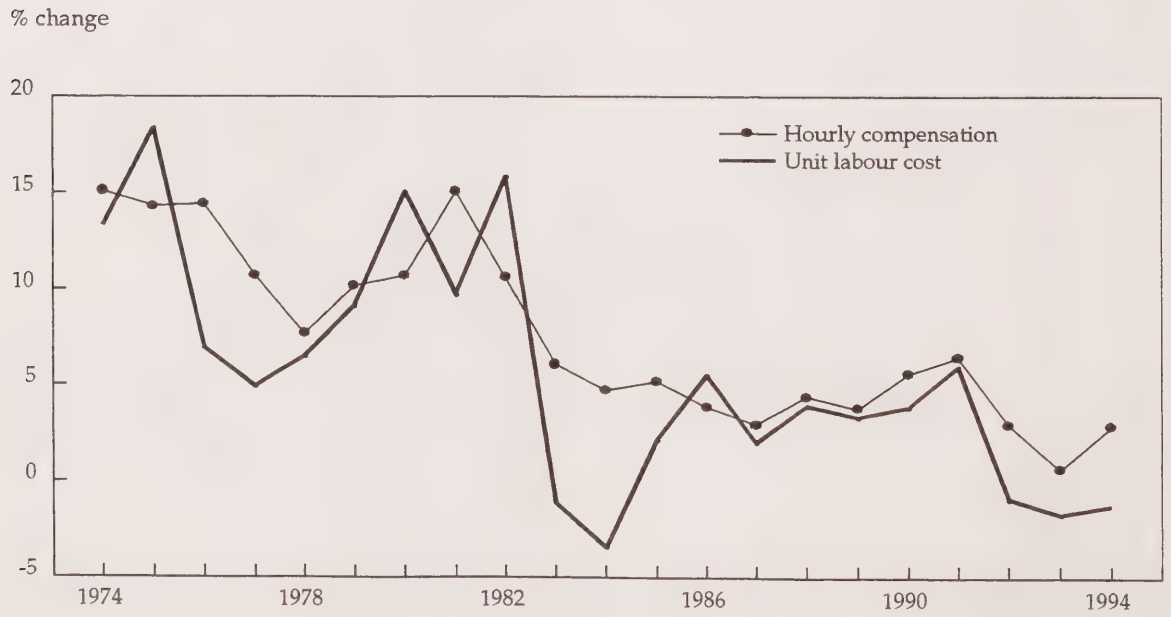


Table 7 - Construction industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	65.5	96.4	104.7	100.8	39.6	65.0	41.1	39.3	60.5
1975	72.7	94.8	103.9	98.5	47.1	73.8	49.7	47.8	64.8
1976	81.9	99.9	102.9	102.8	54.6	79.6	54.7	53.1	66.7
1977	86.1	101.4	100.3	101.7	60.5	84.6	59.7	59.5	70.3
1978	81.8	98.5	101.5	100.0	59.7	81.8	60.6	59.7	73.0
1979	82.6	103.2	102.1	105.4	63.7	78.4	61.7	60.4	77.0
1980	86.8	101.5	102.7	104.3	72.7	83.3	71.7	69.8	83.8
1981	96.7	103.2	101.7	105.0	88.4	92.1	85.6	84.2	91.4
1982	96.8	96.7	96.2	93.0	84.9	104.0	87.9	91.3	87.8
1983	95.1	93.3	97.6	91.0	83.4	104.4	89.4	91.7	87.8
1984	89.1	91.4	99.2	90.6	84.6	98.3	92.6	93.4	95.0
1985	96.0	98.4	100.9	99.3	92.0	96.7	93.5	92.7	95.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.7	105.8	103.5	109.5	117.6	96.5	111.1	107.4	111.2
1988	109.7	113.6	104.6	118.9	134.8	92.3	118.7	113.4	122.9
1989	115.7	119.7	104.0	124.4	151.3	93.0	126.4	121.6	130.7
1990	115.4	123.0	101.0	124.3	158.6	92.8	128.9	127.6	137.5
1991	107.1	113.9	99.2	113.0	149.1	94.8	131.0	132.0	139.2
1992	101.2	110.0	97.5	107.2	145.2	94.4	132.0	135.4	143.4
1993	99.2	107.3	99.3	106.6	140.7	93.1	131.1	132.0	141.8
1994	104.5	111.7	102.2	114.3	149.7	91.5	133.9	131.0	143.2

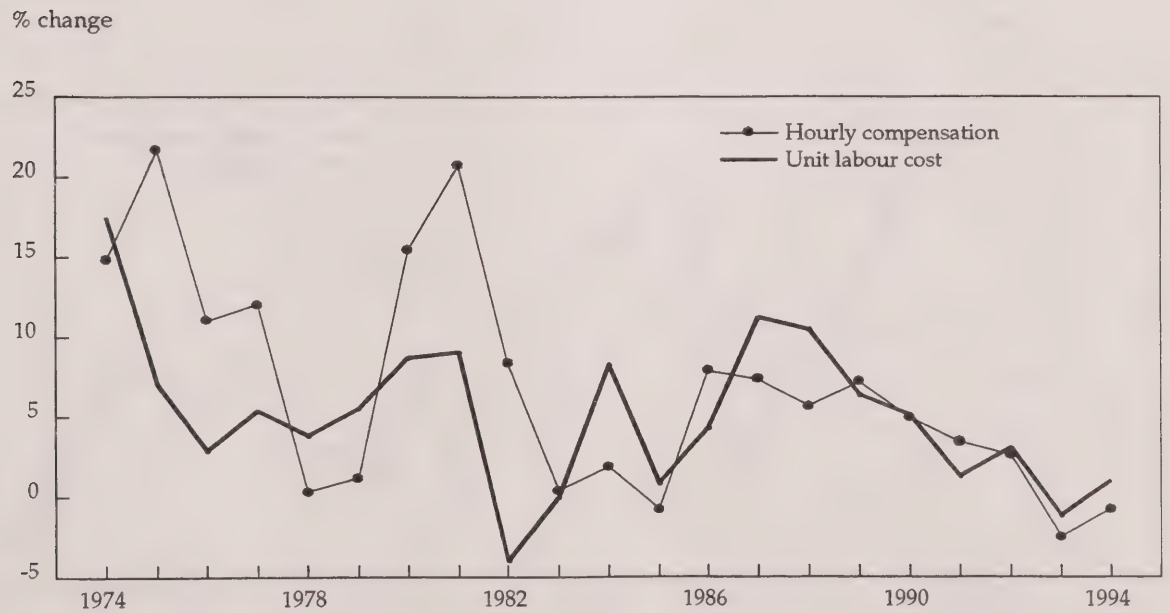


Table 8 - Transportation & storage industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	73.7	89.6	101.3	90.7	32.6	81.3	36.3	35.9	44.2
1975	72.6	88.6	100.7	89.2	37.8	81.3	42.6	42.3	52.0
1976	72.1	87.8	99.6	87.4	42.2	82.5	48.1	48.3	58.6
1977	75.2	93.2	98.5	91.8	48.0	81.9	51.5	52.3	63.8
1978	79.0	95.2	100.8	95.9	53.1	82.4	55.8	55.4	67.2
1979	88.4	98.2	99.9	98.1	59.4	90.1	60.5	60.5	67.2
1980	85.3	102.7	100.4	103.2	67.0	82.7	65.2	64.9	78.5
1981	84.3	104.2	99.2	103.3	75.9	81.6	72.9	73.5	90.0
1982	79.6	98.7	97.9	96.6	79.9	82.4	80.9	82.7	100.4
1983	85.5	94.1	96.3	90.6	82.0	94.3	87.1	90.4	95.9
1984	95.6	96.4	98.9	95.4	89.4	100.2	92.7	93.7	93.5
1985	97.6	97.0	98.8	95.8	95.4	101.8	98.4	99.6	97.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	106.9	102.5	100.7	103.2	105.2	103.6	102.7	102.0	98.4
1988	112.4	102.3	101.7	104.0	112.0	108.0	109.4	107.6	99.6
1989	110.6	103.6	101.4	105.1	118.4	105.3	114.3	112.6	107.0
1990	108.2	103.5	100.2	103.8	121.2	104.3	117.1	116.8	112.0
1991	103.5	100.4	98.7	99.0	123.7	104.6	123.3	125.0	119.5
1992	105.8	100.1	99.8	99.9	128.8	105.9	128.7	129.0	121.8
1993	108.6	100.6	100.6	101.2	128.2	107.3	127.4	126.6	118.0
1994	114.9	104.2	102.5	106.8	134.9	107.6	129.4	126.3	117.4

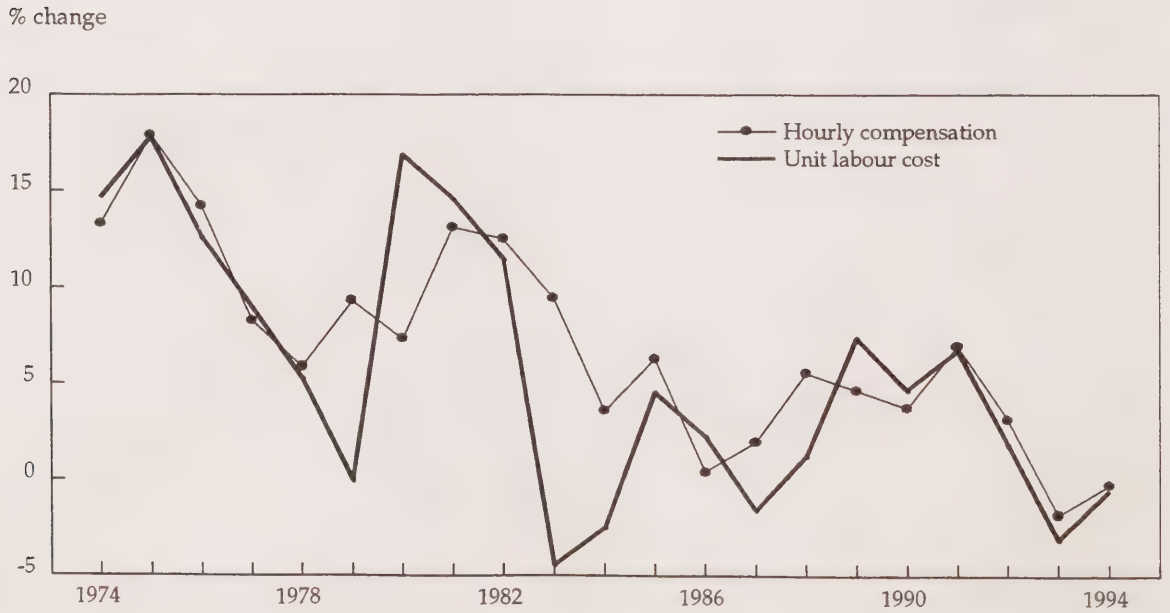


Table 9 - Communication industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	44.9	86.4	101.9	88.0	26.7	51.0	30.9	30.3	59.5
1975	50.6	86.6	100.4	86.9	31.5	58.2	36.3	36.2	62.2
1976	55.7	93.2	99.8	93.0	38.1	59.9	40.9	41.0	68.5
1977	59.1	96.3	99.4	95.7	44.6	61.8	46.3	46.6	75.4
1978	64.8	95.0	100.2	95.2	49.0	68.1	51.6	51.5	75.6
1979	71.2	96.7	99.1	95.9	55.4	74.3	57.3	57.8	77.9
1980	77.9	99.3	99.0	98.3	62.4	79.2	62.8	63.4	80.0
1981	84.0	102.0	98.4	100.4	73.3	83.7	71.9	73.0	87.3
1982	83.9	103.8	98.5	102.2	81.3	82.1	78.4	79.6	96.9
1983	86.1	102.3	95.9	98.2	86.2	87.7	84.2	87.8	100.2
1984	90.2	101.4	98.2	99.6	93.5	90.6	92.2	93.9	103.6
1985	95.4	101.3	99.9	101.2	98.4	94.3	97.1	97.3	103.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	106.7	102.7	99.7	102.4	106.2	104.3	103.4	103.8	99.5
1988	114.9	103.7	100.5	104.2	110.1	110.2	106.1	105.6	95.8
1989	127.1	104.7	99.7	104.4	119.0	121.7	113.6	114.0	93.6
1990	136.2	103.9	98.8	102.7	125.6	132.7	120.9	122.4	92.2
1991	141.3	102.8	97.9	100.7	135.2	140.3	131.5	134.3	95.7
1992	145.5	101.5	97.9	99.4	140.6	146.4	138.6	141.5	96.6
1993	149.7	101.0	97.4	98.4	139.1	152.2	137.8	141.4	92.9
1994	161.2	100.6	98.5	99.1	143.5	162.7	142.6	144.8	89.0

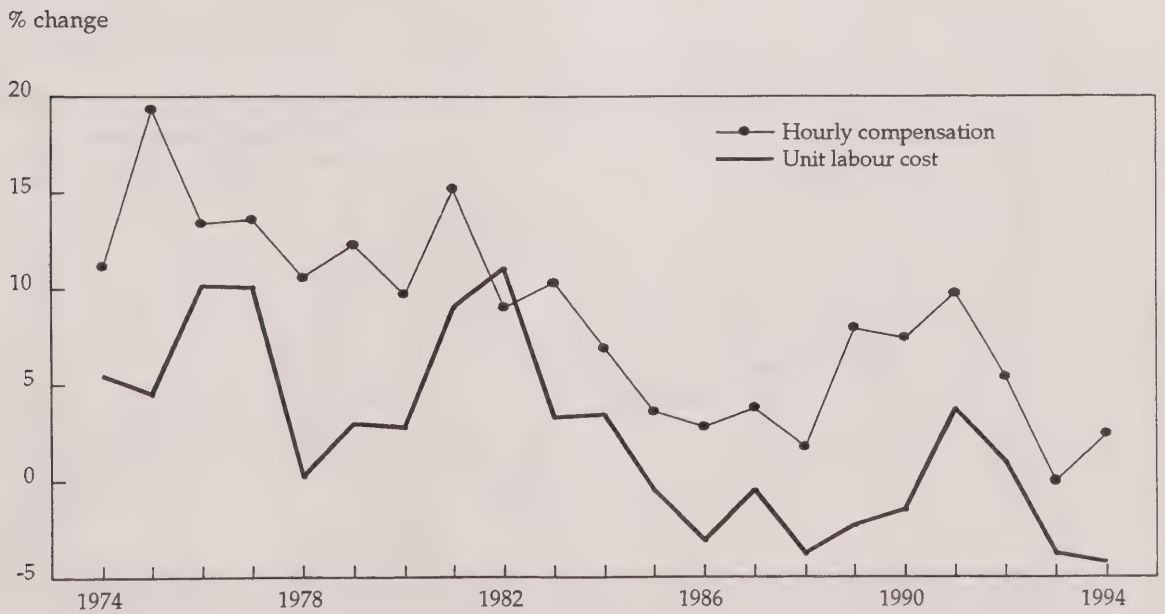


Table 10 - Wholesale trade industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	58.5	72.1	102.2	73.7	29.1	79.4	40.3	39.4	49.7
1975	60.2	74.0	101.0	74.7	35.4	80.6	47.9	47.4	58.9
1976	63.8	74.9	101.1	75.8	40.2	84.2	53.6	53.0	63.0
1977	62.2	77.6	99.5	77.2	43.0	80.6	55.4	55.7	69.1
1978	63.5	81.4	100.8	82.1	47.5	77.4	58.3	57.8	74.8
1979	67.3	82.7	99.6	82.4	54.0	81.6	65.2	65.5	80.2
1980	72.1	81.3	100.0	81.3	61.1	88.7	75.2	75.2	84.8
1981	77.0	87.1	99.6	86.7	69.8	88.8	80.2	80.5	90.7
1982	70.6	83.2	98.7	82.1	71.4	86.0	85.8	87.0	101.1
1983	77.0	89.2	97.6	87.1	76.1	88.4	85.4	87.5	98.9
1984	83.0	94.8	97.8	92.7	84.8	89.6	89.5	91.5	102.2
1985	93.4	100.2	98.2	98.4	92.9	94.9	92.6	94.4	99.5
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	107.8	106.0	99.9	105.9	113.7	101.8	107.3	107.4	105.4
1988	115.7	109.7	100.0	109.7	125.5	105.5	114.3	114.4	108.4
1989	120.6	113.1	98.8	111.7	137.4	107.9	121.5	123.0	113.9
1990	122.0	118.1	100.2	118.4	149.2	103.0	126.2	126.0	122.3
1991	118.8	113.0	99.8	112.8	148.6	105.3	131.5	131.7	125.1
1992	120.0	111.6	99.6	111.2	152.3	108.0	136.4	137.0	126.8
1993	126.6	112.5	99.8	112.2	157.0	112.8	139.5	139.9	124.0
1994	138.2	116.5	101.3	118.0	162.9	117.1	139.9	138.1	117.9

Table 11 - Retail trade industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	74.7	76.9	107.5	82.7	31.8	90.4	41.3	38.4	42.5
1975	78.4	79.3	106.8	84.7	37.6	92.7	47.4	44.4	47.9
1976	83.1	80.2	105.0	84.2	42.8	98.7	53.3	50.8	51.5
1977	83.5	81.2	104.0	84.5	47.4	98.9	58.4	56.1	56.7
1978	85.1	85.1	103.2	87.9	49.9	96.9	58.6	56.8	58.6
1979	85.8	88.3	103.0	91.0	56.4	94.3	63.9	62.0	65.8
1980	84.9	91.3	102.4	93.5	62.6	90.8	68.6	67.0	73.7
1981	85.5	95.2	101.7	96.8	70.3	88.2	73.8	72.6	82.3
1982	82.5	92.7	99.4	92.1	76.0	89.5	82.0	82.5	92.2
1983	86.8	89.1	97.8	87.1	78.2	99.6	87.8	89.8	90.1
1984	91.9	93.8	99.1	93.0	86.1	98.8	91.7	92.5	93.6
1985	96.8	97.3	99.5	96.7	93.3	100.1	96.0	96.5	96.4
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.9	100.9	99.5	100.4	107.1	105.4	106.2	106.7	101.2
1988	109.1	103.6	99.2	102.8	117.6	106.2	113.5	114.4	107.7
1989	111.8	105.4	98.7	104.1	127.6	107.5	121.1	122.6	114.1
1990	109.3	105.6	99.5	105.1	132.8	104.0	125.8	126.4	121.5
1991	103.6	104.5	97.5	101.9	135.1	101.7	129.3	132.6	130.4
1992	104.9	103.0	98.5	101.4	136.4	103.4	132.4	134.4	130.1
1993	108.8	102.7	98.1	100.8	139.3	107.9	135.6	138.2	128.0
1994	115.0	104.7	97.8	102.3	144.6	112.4	138.2	141.3	125.8

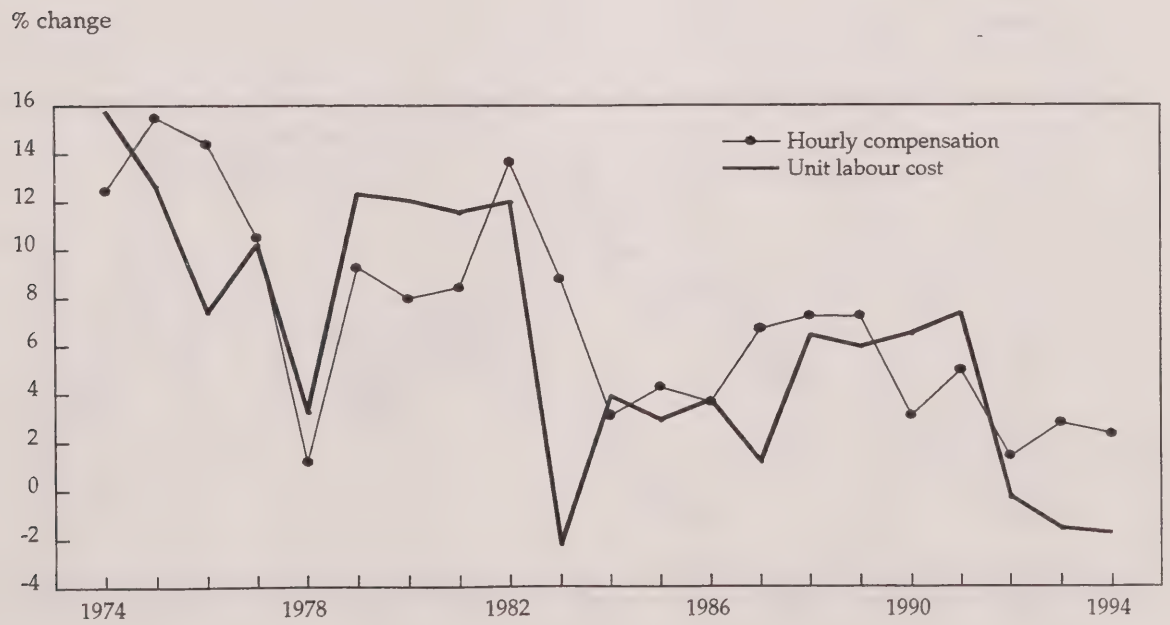


Table 12 - Community, business, personal services industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	57.2	53.0	107.8	57.1	24.4	100.2	46.0	42.7	42.6
1975	59.9	56.1	107.9	60.5	27.6	99.0	49.1	45.5	46.0
1976	64.6	58.6	107.0	62.8	33.0	102.8	56.3	52.6	51.1
1977	66.3	62.4	104.2	65.0	36.3	102.0	58.1	55.8	54.7
1978	70.9	65.9	105.8	69.7	40.4	101.7	61.3	57.9	56.9
1979	73.6	70.7	104.5	73.9	45.6	99.5	64.5	61.7	62.0
1980	81.0	75.4	103.4	78.0	54.2	103.8	71.8	69.5	66.9
1981	87.6	80.2	102.8	82.5	62.8	106.2	78.2	76.1	71.7
1982	86.3	82.9	100.6	83.5	70.1	103.4	84.5	83.9	81.1
1983	85.1	86.6	99.8	86.4	74.3	98.5	85.7	85.9	87.2
1984	90.1	88.6	100.1	88.7	82.1	101.6	92.7	92.6	91.1
1985	93.6	97.0	100.4	97.4	91.7	96.1	94.5	94.2	98.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.7	105.2	101.1	106.3	113.0	99.4	107.4	106.3	106.9
1988	113.7	111.1	101.8	113.1	127.4	100.5	114.7	112.6	112.1
1989	119.2	115.7	100.7	116.5	142.6	102.3	123.3	122.4	119.6
1990	118.1	119.2	100.9	120.3	153.2	98.2	128.5	127.4	129.8
1991	116.1	117.1	99.4	116.5	160.0	99.7	136.6	137.4	137.8
1992	116.9	118.2	98.1	115.9	165.8	100.8	140.2	143.0	141.8
1993	119.4	125.0	99.0	123.7	171.8	96.5	137.5	138.9	143.9
1994	123.5	130.1	99.2	129.1	183.6	95.6	141.1	142.2	148.7

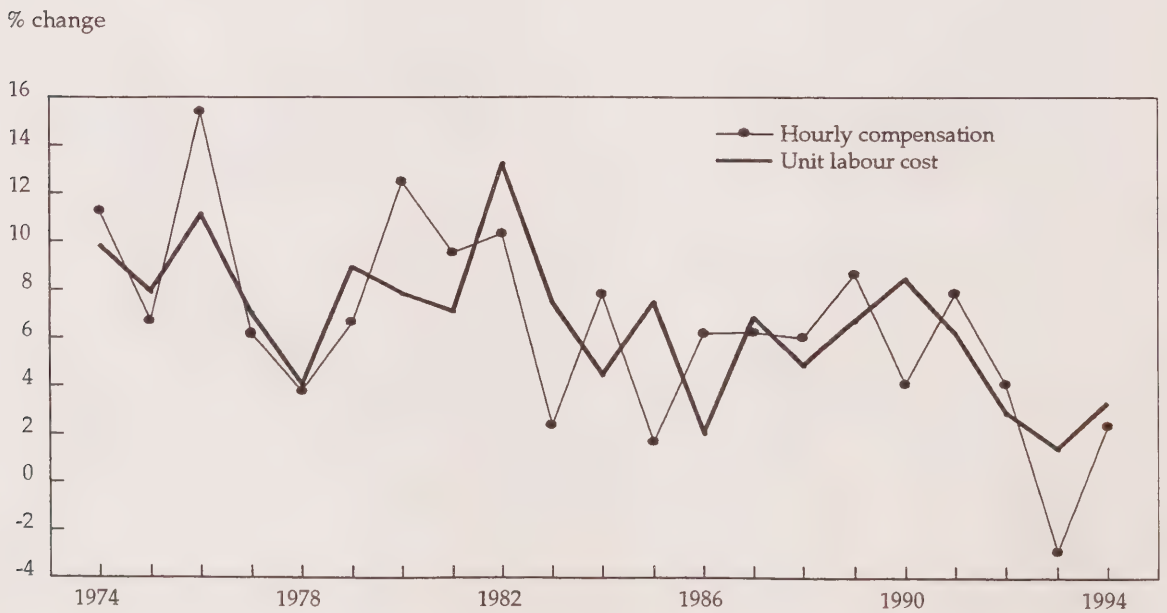


Table 13 - Food industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	82.2	96.9	103.4	100.2	33.8	82.0	34.8	33.7	41.1
1975	76.3	96.6	103.8	100.2	39.4	76.2	40.8	39.4	51.6
1976	84.6	96.4	103.6	99.9	44.9	84.7	46.6	45.0	53.1
1977	89.3	98.0	102.7	100.6	49.6	88.8	50.7	49.3	55.6
1978	90.6	100.1	102.4	102.6	54.4	88.3	54.3	53.0	60.0
1979	93.7	101.1	102.3	103.4	60.5	90.7	59.8	58.5	64.5
1980	91.3	102.4	101.1	103.5	67.2	88.1	65.6	64.9	73.6
1981	92.0	101.1	99.9	101.1	75.9	91.0	75.0	75.1	82.5
1982	91.9	98.2	99.3	97.5	80.7	94.3	82.2	82.8	87.8
1983	90.3	95.9	101.6	97.4	84.9	92.7	88.5	87.2	94.0
1984	94.4	96.0	101.9	97.9	88.4	96.4	92.1	90.4	93.7
1985	100.6	98.6	100.4	99.0	93.8	101.6	95.2	94.7	93.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	100.7	101.1	101.0	102.2	106.1	98.6	104.9	103.9	105.3
1988	100.3	102.7	101.9	104.6	113.4	95.8	110.4	108.4	113.1
1989	97.1	103.6	100.9	104.5	116.4	92.9	112.3	111.3	119.9
1990	98.9	101.6	102.2	103.8	119.9	95.2	118.1	115.5	121.3
1991	101.2	98.5	101.7	100.2	121.9	101.0	123.8	121.7	120.5
1992	102.7	99.3	101.9	101.3	127.5	101.5	128.4	126.0	124.1

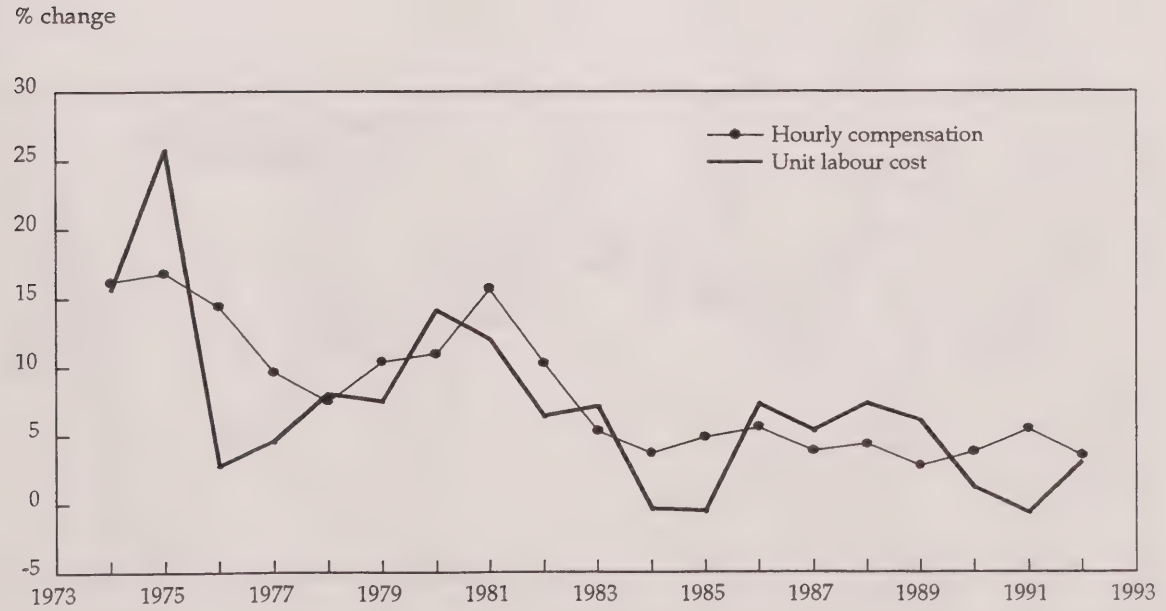


Table 14 - Beverage industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	121.0	102.7	103.7	106.5	33.1	113.7	32.2	31.0	27.3
1975	116.3	103.0	104.1	107.2	38.4	108.5	37.3	35.9	33.1
1976	112.7	103.3	103.9	107.3	44.2	105.0	42.8	41.2	39.3
1977	118.3	104.4	103.0	107.5	48.9	110.0	46.9	45.5	41.4
1978	115.7	103.1	102.7	106.0	52.0	109.2	50.4	49.1	45.0
1979	118.3	105.0	102.6	107.6	58.4	109.9	55.6	54.2	49.3
1980	114.0	102.0	101.4	103.4	64.0	110.2	62.8	61.9	56.2
1981	113.4	103.1	100.2	103.3	72.0	109.8	69.8	69.7	63.5
1982	103.3	100.6	99.5	100.1	78.5	103.2	78.0	78.4	76.0
1983	99.3	98.7	100.2	98.9	84.2	100.4	85.3	85.1	84.8
1984	103.8	99.9	97.5	97.5	89.7	106.5	89.8	92.0	86.4
1985	105.4	100.5	100.4	100.9	94.8	104.5	94.2	93.9	89.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	101.7	98.8	101.3	100.1	103.7	101.5	104.9	103.6	102.0
1988	105.1	99.2	102.9	102.1	106.8	102.9	107.6	104.6	101.6
1989	106.3	87.4	99.0	86.5	98.4	122.9	112.6	113.8	92.6
1990	101.8	75.2	100.1	75.3	90.9	135.3	120.9	120.8	89.3
1991	91.8	72.9	99.9	72.8	97.0	126.0	133.0	133.2	105.7
1992	101.7	84.4	99.1	83.7	112.6	121.5	133.4	134.6	110.7

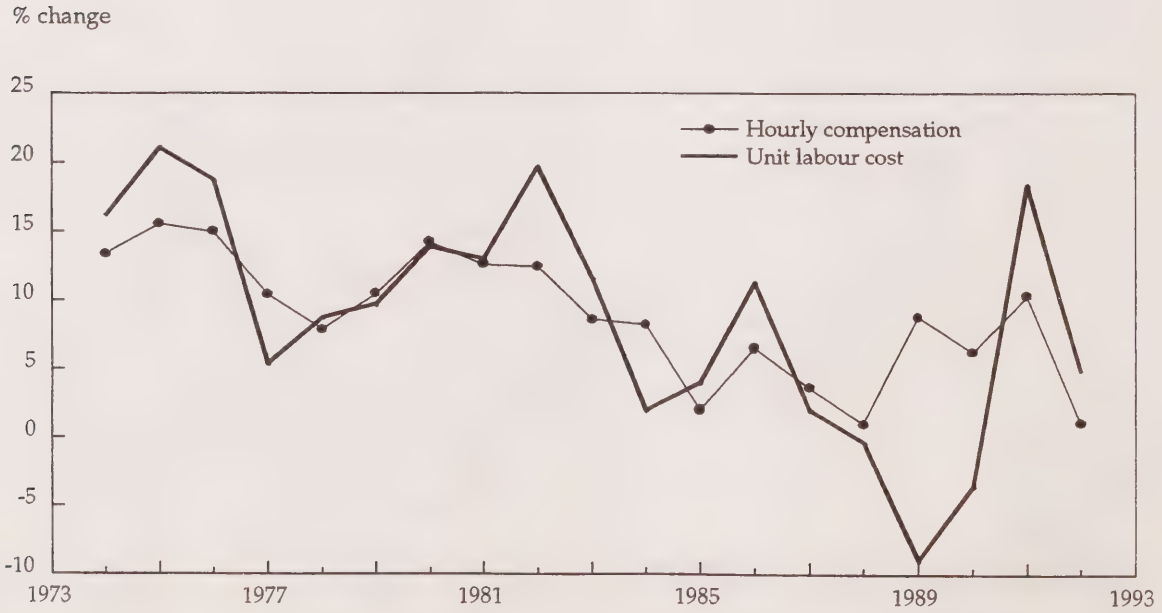


Table 15 - Tobacco products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	152.9	136.5	108.1	147.6	36.4	103.6	26.7	24.7	23.8
1975	154.4	138.2	109.2	151.0	43.9	102.2	31.8	29.1	28.5
1976	146.8	129.7	109.5	142.1	47.2	103.3	36.4	33.2	32.1
1977	168.4	127.4	106.8	136.0	52.2	123.9	41.0	38.4	31.0
1978	142.6	124.8	107.2	133.7	53.8	106.7	43.2	40.3	37.8
1979	147.5	123.7	107.5	133.0	58.3	110.9	47.2	43.9	39.6
1980	149.6	120.8	105.3	127.2	63.9	117.6	52.9	50.3	42.7
1981	153.4	124.2	106.7	132.5	77.4	115.7	62.3	58.4	50.4
1982	149.6	123.7	104.1	128.7	84.0	116.2	67.9	65.3	56.1
1983	135.2	114.9	104.4	120.0	89.2	112.6	77.6	74.3	66.0
1984	128.3	109.1	103.8	113.3	91.9	113.2	84.2	81.1	71.6
1985	105.9	101.5	106.0	107.6	96.2	98.4	94.7	89.4	90.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	106.5	85.1	102.9	87.5	94.8	121.6	111.4	108.3	89.1
1988	108.6	78.7	103.3	81.3	89.6	133.6	113.9	110.2	82.5
1989	99.9	73.7	102.0	75.2	90.8	132.8	123.2	120.7	90.9
1990	96.6	70.5	103.4	72.9	92.9	132.4	131.7	127.3	96.2
1991	93.9	68.8	105.0	72.3	98.2	129.9	142.7	135.9	104.6
1992	85.5	70.2	103.4	72.6	102.3	117.9	145.7	141.0	119.6

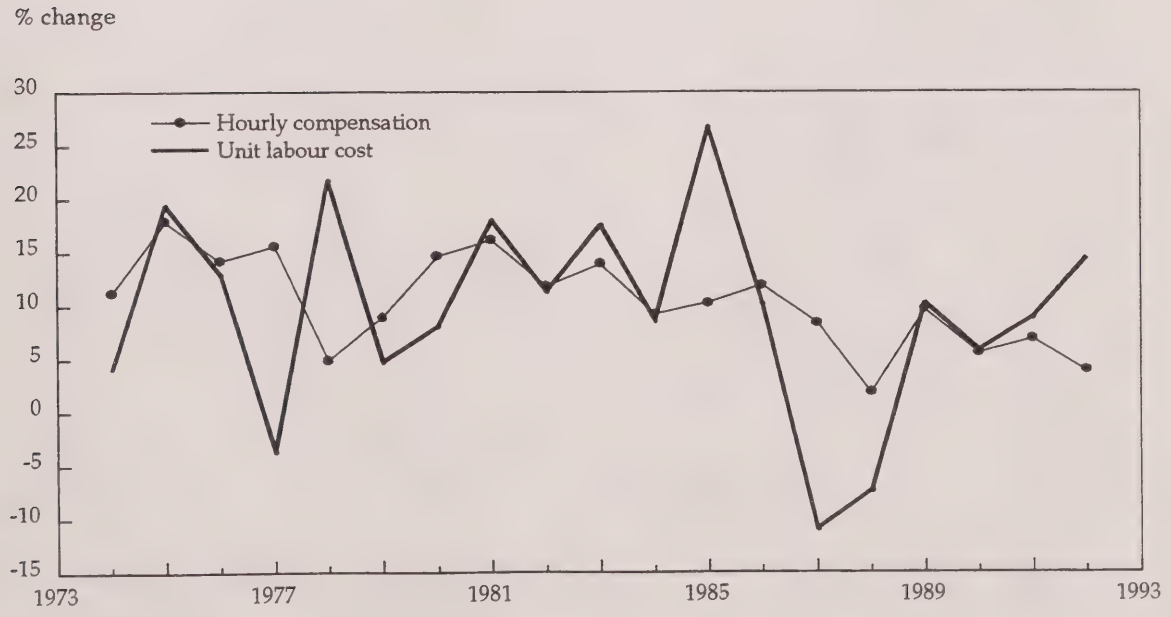


Table 16 - Rubber products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	66.9	95.2	101.0	96.1	31.2	69.6	32.8	32.4	46.6
1975	64.0	96.4	100.5	97.0	35.9	66.0	37.3	37.1	56.2
1976	79.3	100.8	101.4	102.1	41.9	77.6	41.6	41.0	52.8
1977	90.9	101.1	100.8	102.0	45.9	89.1	45.4	45.0	50.5
1978	94.6	102.9	101.1	104.0	49.9	91.0	48.6	48.0	52.8
1979	107.6	105.7	103.6	109.6	60.1	98.2	56.9	54.9	55.9
1980	92.7	102.2	100.8	103.1	63.4	90.0	62.0	61.5	68.3
1981	88.0	103.3	101.7	105.1	73.5	83.7	71.2	70.0	83.6
1982	76.7	97.3	101.2	98.5	76.4	77.9	78.5	77.6	99.6
1983	89.6	97.6	101.4	99.0	81.4	90.5	83.4	82.3	90.9
1984	112.9	99.3	101.2	100.5	90.6	112.3	91.2	90.1	80.3
1985	114.5	98.4	101.5	99.9	93.4	114.6	94.8	93.4	81.5
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.7	94.1	100.5	94.6	97.0	110.8	103.1	102.6	92.6
1988	110.0	101.6	101.8	103.4	109.1	106.3	107.4	105.6	99.3
1989	106.4	99.4	101.4	100.7	109.3	105.6	110.0	108.5	102.7
1990	103.8	96.4	100.2	96.6	112.8	107.5	117.0	116.8	108.6
1991	93.3	88.9	100.9	89.7	110.4	104.0	124.1	123.1	118.3
1992	116.5	89.6	102.3	91.6	114.6	127.1	127.9	125.1	98.4

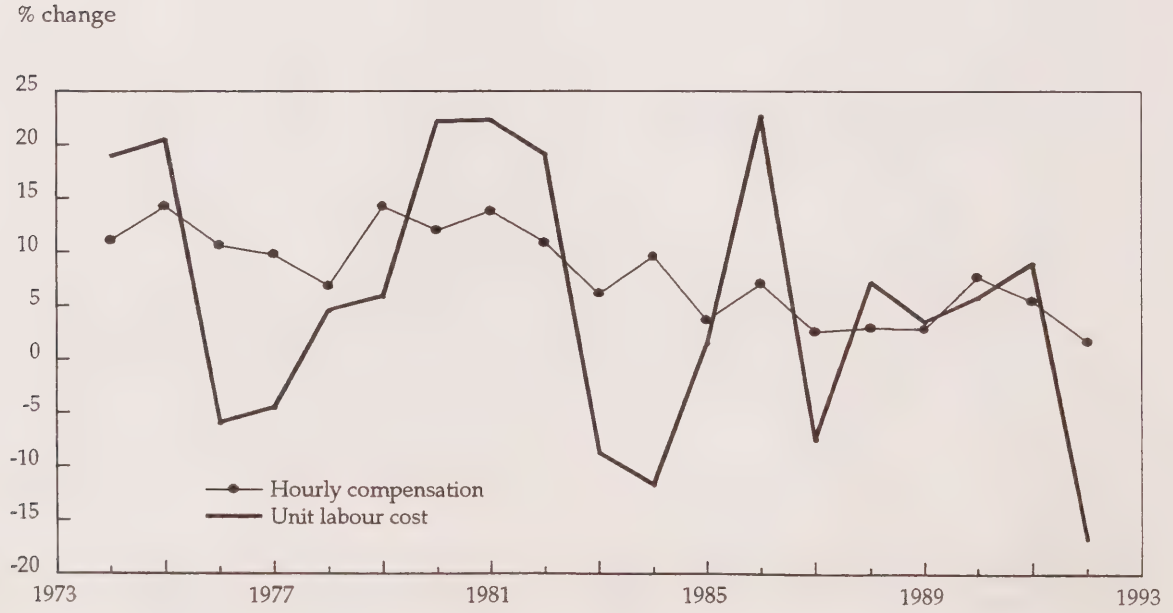


Table 17 - Plastic products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	52.7	66.7	99.8	66.6	24.3	79.1	36.4	36.5	46.1
1975	47.9	65.5	99.3	65.1	26.7	73.6	40.8	41.0	55.7
1976	53.5	68.7	100.2	68.8	32.1	77.8	46.7	46.6	59.9
1977	56.2	69.6	99.6	69.3	35.7	81.0	51.3	51.5	63.6
1978	63.7	76.1	99.9	76.0	42.0	83.8	55.1	55.2	65.9
1979	73.7	80.0	102.4	82.0	48.1	90.0	60.2	58.7	65.3
1980	73.5	82.4	99.6	82.1	54.6	89.5	66.2	66.5	74.3
1981	75.5	81.6	100.5	82.0	61.6	92.0	75.5	75.1	81.6
1982	68.8	76.4	100.0	76.4	62.6	90.1	82.0	82.0	91.0
1983	78.7	76.3	101.2	77.2	67.4	101.9	88.3	87.3	85.6
1984	90.1	85.4	100.2	85.6	77.9	105.3	91.2	91.1	86.5
1985	99.6	92.3	101.2	93.4	89.1	106.7	96.5	95.4	89.4
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	112.3	108.0	100.8	108.8	111.8	103.2	103.5	102.7	99.5
1988	115.1	122.2	101.1	123.5	133.3	93.2	109.1	107.9	115.8
1989	118.7	127.6	102.4	130.6	142.7	90.9	111.8	109.2	120.2
1990	113.4	125.5	101.0	126.7	149.5	89.6	119.2	118.0	131.8
1991	107.8	122.7	102.2	125.4	149.6	86.0	121.9	119.3	138.8
1992	112.1	118.8	102.4	121.7	150.5	92.1	126.7	123.7	134.3

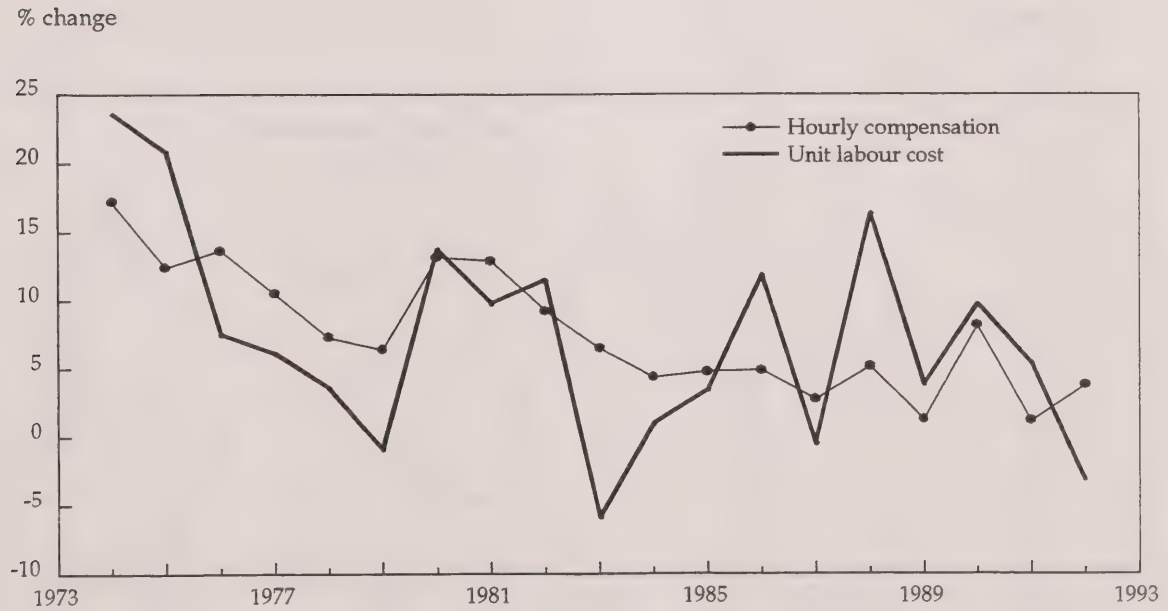


Table 18 - Leather & allied products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compen-sation	Real GDP per hour worked	Compen-sation per person	Hourly compen-sation	Unit labour unit
1974	86.8	121.0	105.9	128.2	46.6	67.7	38.5	36.4	53.7
1975	87.2	121.7	102.9	125.2	52.6	69.7	43.2	42.0	60.3
1976	95.9	120.4	103.7	124.9	59.7	76.8	49.6	47.8	62.3
1977	88.9	107.7	104.0	112.0	58.6	79.3	54.4	52.3	65.9
1978	101.7	110.9	103.3	114.5	66.0	88.8	59.5	57.6	64.9
1979	103.1	115.8	104.0	120.4	75.6	85.6	65.3	62.8	73.4
1980	98.5	113.2	102.4	115.9	78.6	84.9	69.4	67.8	79.8
1981	103.5	117.3	102.3	120.1	91.5	86.2	78.0	76.2	88.4
1982	90.2	101.2	103.3	104.6	85.2	86.2	84.2	81.5	94.5
1983	95.2	101.9	100.6	102.5	89.3	92.9	87.7	87.2	93.8
1984	104.3	104.1	101.5	105.6	96.7	98.7	92.9	91.5	92.7
1985	100.1	98.6	101.4	99.9	97.0	100.2	98.5	97.1	97.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	92.7	92.9	98.1	91.1	96.1	101.7	103.4	105.5	103.7
1988	86.2	86.3	99.0	85.5	92.0	100.9	106.6	107.7	106.7
1989	83.5	79.1	103.5	81.8	86.3	102.0	109.2	105.5	103.4
1990	72.5	71.0	102.2	72.6	85.2	99.9	119.9	117.3	117.4
1991	57.2	59.2	101.7	60.3	72.3	95.0	122.0	119.9	126.3
1992	56.0	55.8	101.9	56.9	69.0	98.4	123.7	121.3	123.3

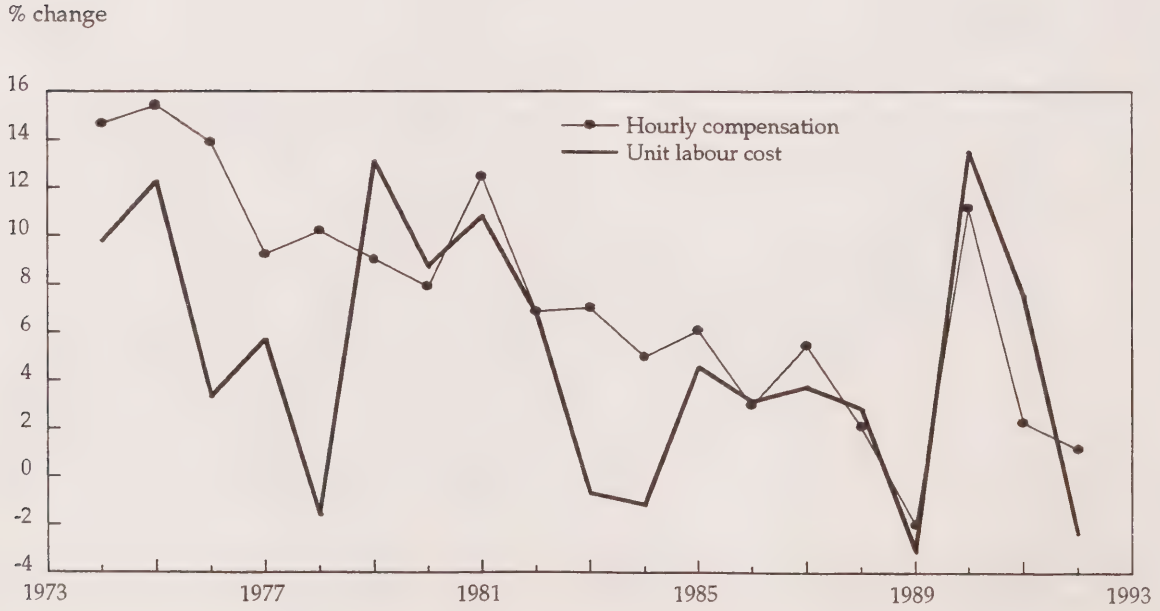


Table 19 - Primary textile & textile products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	72.1	128.7	102.9	132.4	43.9	54.4	34.1	33.1	60.9
1975	70.8	121.0	102.4	123.9	46.3	57.2	38.2	37.3	65.3
1976	72.0	113.3	101.8	115.3	50.4	62.4	44.5	43.7	70.0
1977	75.8	106.2	101.0	107.2	52.6	70.8	49.5	49.0	69.3
1978	83.4	108.1	101.1	109.3	58.3	76.3	53.9	53.3	69.9
1979	90.6	112.1	101.0	113.2	67.0	80.0	59.8	59.2	74.0
1980	88.1	111.3	99.8	111.1	73.5	79.3	66.0	66.1	83.4
1981	91.8	109.6	100.6	110.3	80.9	83.2	73.8	73.3	88.1
1982	71.2	96.4	101.3	97.7	75.7	72.9	78.5	77.5	106.3
1983	91.6	102.7	100.4	103.1	86.8	88.9	84.5	84.2	94.7
1984	91.1	101.5	99.6	101.1	90.3	90.1	89.0	89.3	99.2
1985	90.4	97.8	98.4	96.2	94.0	94.0	96.1	97.7	103.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	102.9	102.6	100.4	103.0	108.2	99.9	105.5	105.0	105.1
1988	101.2	104.5	100.9	105.4	113.7	96.0	108.8	107.8	112.3
1989	98.3	100.7	102.2	102.9	113.0	95.5	112.3	109.8	115.0
1990	89.2	94.6	100.4	95.0	111.0	93.8	117.3	116.8	124.5
1991	83.4	89.3	101.8	90.9	107.9	91.8	120.7	118.7	129.3
1992	80.5	77.7	104.1	80.8	100.4	99.6	129.2	124.2	124.7

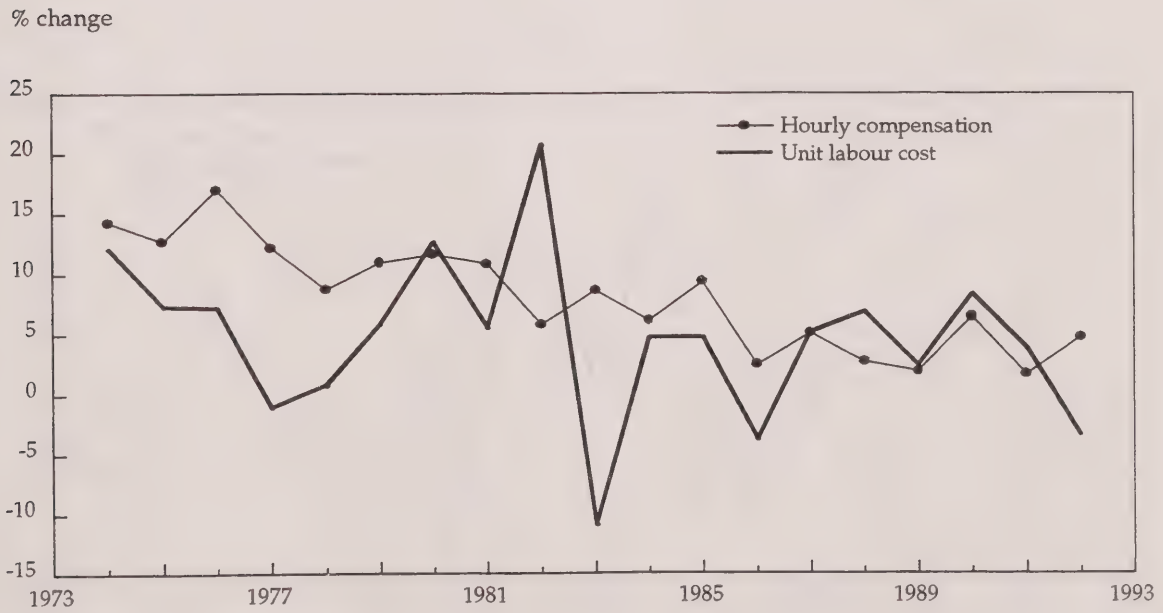


Table 20 - Clothing industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	78.9	109.0	100.9	109.9	42.9	71.8	39.4	39.0	54.3
1975	81.8	107.9	101.1	109.1	49.4	74.9	45.7	45.2	60.4
1976	87.2	109.4	100.8	110.2	56.7	79.1	51.9	51.5	65.1
1977	85.7	101.9	100.1	102.0	58.4	84.1	57.3	57.2	68.1
1978	92.9	102.6	100.0	102.5	64.1	90.6	62.5	62.5	68.9
1979	99.7	103.8	100.1	103.9	71.7	96.0	69.1	69.0	71.9
1980	94.1	99.9	98.4	98.3	75.7	95.7	75.8	77.1	80.5
1981	96.9	99.7	97.3	96.9	82.2	100.0	82.5	84.8	84.8
1982	86.1	94.0	95.7	89.9	80.3	95.7	85.5	89.3	93.3
1983	86.2	96.6	99.2	95.8	85.3	90.0	88.3	89.1	99.0
1984	92.8	97.3	100.0	97.3	90.1	95.4	92.6	92.6	97.1
1985	95.8	97.5	99.3	96.9	93.3	98.9	95.7	96.3	97.4
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	103.6	98.5	103.8	102.2	105.9	101.4	107.5	103.6	102.2
1988	101.4	101.6	101.6	103.2	112.8	98.3	111.0	109.2	111.2
1989	100.2	98.7	100.9	99.6	115.0	100.6	116.6	115.6	114.8
1990	95.3	91.1	101.9	92.9	111.6	102.6	122.5	120.2	117.1
1991	86.4	82.2	102.4	84.2	104.3	102.6	126.8	123.9	120.7
1992	82.5	74.4	102.9	76.6	98.8	107.7	132.7	128.9	119.7

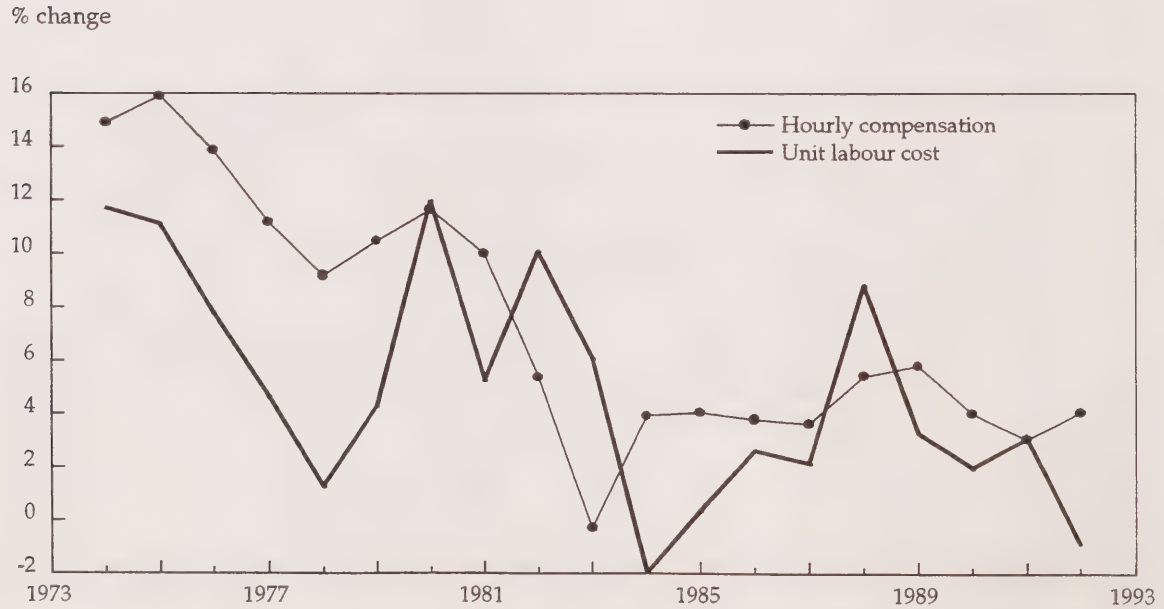


Table 21 - Wood industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	63.5	97.2	102.2	99.4	35.0	63.9	36.0	35.3	55.1
1975	56.4	89.3	101.8	90.9	36.6	62.1	41.0	40.3	64.9
1976	68.4	97.6	102.6	100.1	46.8	68.4	47.9	46.7	68.3
1977	75.9	100.0	101.8	101.8	54.1	74.6	54.1	53.1	71.2
1978	76.2	107.3	101.1	108.5	62.3	70.2	58.1	57.4	81.7
1979	76.4	110.2	101.2	111.5	70.9	68.5	64.4	63.6	92.8
1980	81.5	106.0	100.3	106.4	75.7	76.6	71.4	71.1	92.9
1981	78.3	101.7	95.4	97.0	79.4	80.7	78.1	81.9	101.4
1982	63.3	87.8	91.3	80.2	72.4	79.0	82.5	90.3	114.4
1983	78.3	92.0	96.7	89.0	83.6	88.0	90.9	94.0	106.9
1984	87.8	92.9	98.9	91.8	88.0	95.6	94.7	95.8	100.2
1985	99.7	97.0	99.8	96.8	95.3	103.0	98.3	98.5	95.6
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	115.4	109.4	100.5	110.0	116.3	105.0	106.4	105.8	100.8
1988	117.7	111.5	102.3	114.2	123.3	103.1	110.6	108.0	104.8
1989	115.4	111.6	101.0	112.7	125.9	102.4	112.8	111.7	109.1
1990	105.9	104.2	100.3	104.4	123.1	101.4	118.2	117.9	116.3
1991	94.8	90.7	98.9	89.7	112.4	105.7	124.0	125.4	118.6
1992	102.3	92.9	100.8	93.6	119.5	109.2	128.6	127.6	116.8

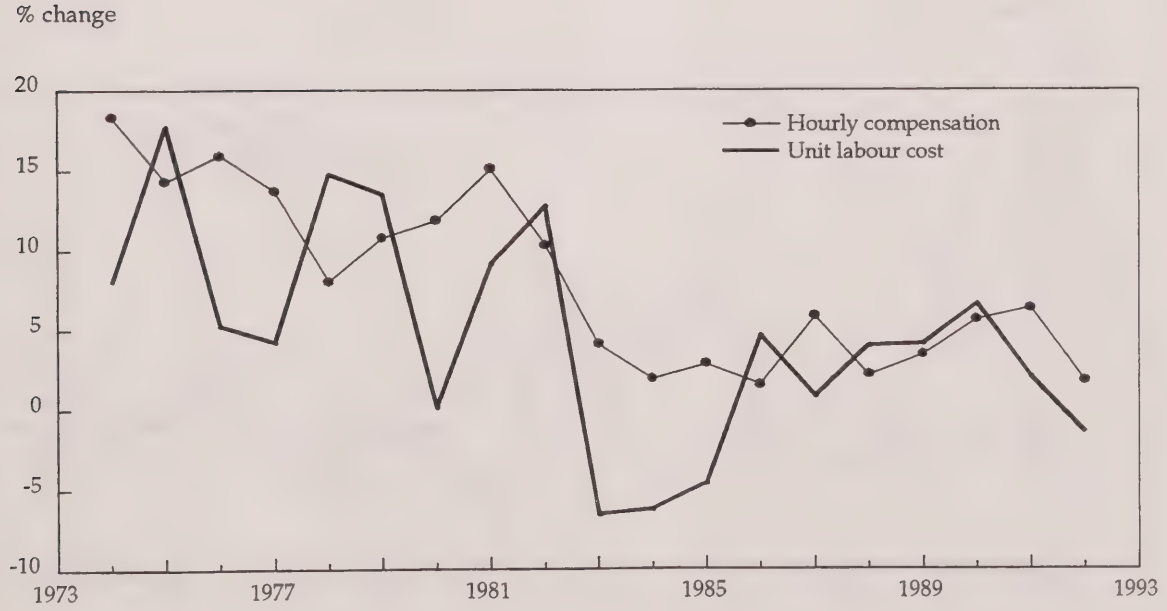


Table 22 - Furniture & fixture industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	85.2	88.6	104.0	92.2	33.8	92.4	38.2	36.7	39.7
1975	80.6	86.5	103.4	89.4	37.1	90.2	42.9	41.4	46.0
1976	88.2	83.7	104.1	87.2	41.7	101.2	49.8	47.9	47.3
1977	81.9	76.5	103.7	79.3	41.6	103.3	54.4	52.4	50.7
1978	89.7	78.7	103.1	81.1	45.8	110.6	58.2	56.5	51.1
1979	88.5	85.9	104.2	89.5	53.0	98.9	61.7	59.2	59.9
1980	82.3	85.6	102.5	87.7	58.4	93.9	68.2	66.6	70.9
1981	91.7	88.5	101.9	90.2	69.8	101.6	78.8	77.3	76.1
1982	69.9	79.8	101.3	80.8	64.9	86.5	81.4	80.4	92.9
1983	79.0	78.8	98.7	77.7	69.4	101.6	88.2	89.3	87.9
1984	85.0	81.6	99.7	81.4	76.0	104.5	93.1	93.4	89.4
1985	94.7	89.9	99.6	89.5	87.1	105.9	97.0	97.4	92.0
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	99.8	110.9	100.5	111.4	111.8	89.5	100.9	100.4	112.1
1988	97.3	112.2	100.4	112.6	121.8	86.4	108.6	108.2	125.3
1989	96.2	114.1	96.3	109.9	127.2	87.6	111.5	115.8	132.3
1990	90.2	106.4	98.7	105.1	125.2	85.8	117.7	119.2	138.9
1991	74.4	91.2	99.5	90.8	111.9	82.0	122.7	123.3	150.5
1992	74.3	80.6	99.6	80.2	104.0	92.6	129.0	129.6	140.0

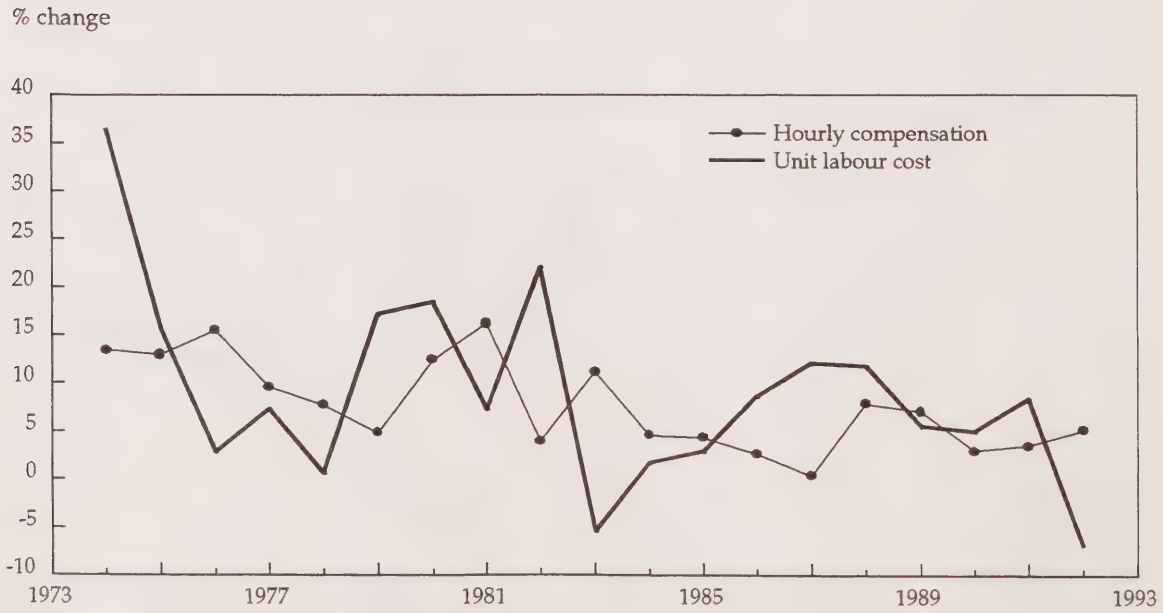


Table 23 - Paper & allied products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	108.6	109.9	102.9	113.1	35.6	96.0	32.4	31.5	32.8
1975	77.3	106.5	93.5	99.6	36.6	77.6	34.3	36.7	47.4
1976	95.3	109.1	98.6	107.6	45.9	88.6	42.1	42.7	48.2
1977	94.2	104.0	102.0	106.0	49.3	88.8	47.5	46.5	52.4
1978	104.1	105.5	107.4	113.2	54.3	91.9	51.4	47.9	52.1
1979	102.8	106.9	101.2	108.1	59.3	95.1	55.4	54.8	57.6
1980	100.7	107.8	106.7	115.0	66.1	87.6	61.3	57.4	65.6
1981	96.7	107.6	100.4	108.1	75.4	89.5	70.1	69.8	78.0
1982	82.9	100.5	99.7	100.2	78.0	82.7	77.7	77.9	94.2
1983	92.8	97.6	100.1	97.7	82.1	94.9	84.1	84.0	88.5
1984	96.1	98.9	100.3	99.2	86.6	96.9	87.6	87.3	90.1
1985	94.9	97.5	100.4	97.9	92.8	96.9	95.1	94.8	97.7
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	106.0	102.0	99.7	101.7	105.4	104.3	103.4	103.7	99.4
1988	106.4	103.1	100.7	103.8	112.0	102.5	108.6	107.9	105.3
1989	102.4	101.8	102.3	104.2	114.7	98.3	112.6	110.1	112.0
1990	99.0	98.0	100.9	98.9	115.9	100.2	118.3	117.2	117.0
1991	94.8	93.8	99.6	93.4	117.8	101.6	125.6	126.2	124.2
1992	95.3	89.1	102.8	91.5	116.3	104.1	130.6	127.1	122.1

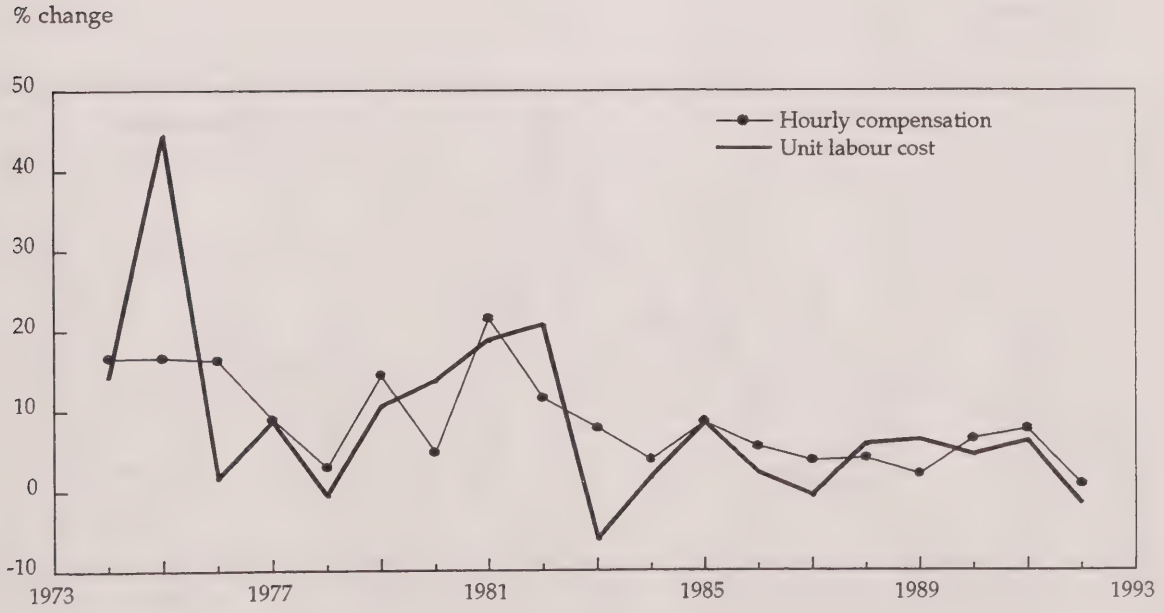


Table 24 - Printing, publishing & allied industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	65.5	78.4	103.7	81.3	27.9	80.5	35.6	34.3	42.6
1975	66.4	78.7	103.2	81.2	31.6	81.7	40.1	38.9	47.6
1976	72.9	79.3	102.3	81.1	35.9	89.9	45.3	44.2	49.2
1977	76.5	78.1	101.6	79.3	38.7	96.4	49.5	48.7	50.6
1978	82.3	81.7	102.4	83.7	43.2	98.4	52.8	51.6	52.5
1979	84.1	85.4	101.3	86.6	48.7	97.1	57.0	56.2	57.9
1980	88.8	89.3	102.5	91.6	56.2	96.9	62.9	61.4	63.3
1981	91.0	89.8	100.5	90.2	64.2	100.8	71.6	71.2	70.6
1982	83.4	89.4	100.7	90.1	69.2	92.5	77.4	76.8	83.0
1983	86.3	89.3	99.8	89.1	75.5	96.8	84.5	84.7	87.5
1984	93.2	92.1	100.4	92.5	82.1	100.7	89.2	88.8	88.2
1985	97.6	95.0	99.9	95.0	90.3	102.8	95.0	95.1	92.5
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	99.8	103.4	100.3	103.7	107.2	96.2	103.6	103.3	107.4
1988	104.6	108.2	101.1	109.5	121.2	95.5	111.9	110.7	115.9
1989	107.4	114.1	100.7	114.8	132.0	93.5	115.8	115.0	123.0
1990	105.7	114.9	101.4	116.6	139.1	90.7	121.1	119.3	131.6
1991	94.5	108.0	101.7	109.9	137.5	86.0	127.3	125.2	145.6
1992	88.1	103.7	103.1	106.9	135.7	82.4	130.9	127.0	154.1

Table 25 - Primary metal industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	107.6	118.5	105.5	124.9	36.9	86.1	31.1	29.5	34.3
1975	98.0	116.6	101.3	118.1	41.4	83.0	35.5	35.0	42.2
1976	90.2	113.7	101.1	115.0	45.4	78.4	39.9	39.5	50.3
1977	98.9	115.5	101.6	117.4	50.5	84.2	43.7	43.0	51.0
1978	104.1	118.3	102.0	120.6	55.9	86.3	47.3	46.4	53.7
1979	94.8	122.9	103.2	126.8	63.7	74.8	51.8	50.2	67.2
1980	87.3	124.5	103.1	128.4	72.2	67.9	58.0	56.2	82.7
1981	94.5	120.9	101.5	122.7	81.2	77.0	67.2	66.2	85.9
1982	71.0	109.8	100.2	110.0	84.1	64.5	76.6	76.4	118.4
1983	80.1	102.5	100.0	102.5	85.0	78.2	82.9	82.9	106.1
1984	98.0	105.3	104.0	109.4	95.6	89.5	90.8	87.3	97.5
1985	103.7	103.2	99.4	102.6	98.9	101.1	95.9	96.5	95.4
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	110.5	100.7	100.3	101.0	104.6	109.4	103.8	103.6	94.6
1988	116.4	105.1	102.1	107.4	114.3	108.4	108.7	106.5	98.2
1989	113.0	102.5	100.6	103.1	116.5	109.6	113.7	113.0	103.1
1990	105.1	93.2	103.1	96.1	111.3	109.4	119.5	115.9	106.0
1991	105.4	89.3	102.3	91.3	114.2	115.5	128.0	125.1	108.4
1992	108.7	84.3	104.9	88.5	114.2	122.9	135.5	129.1	105.1

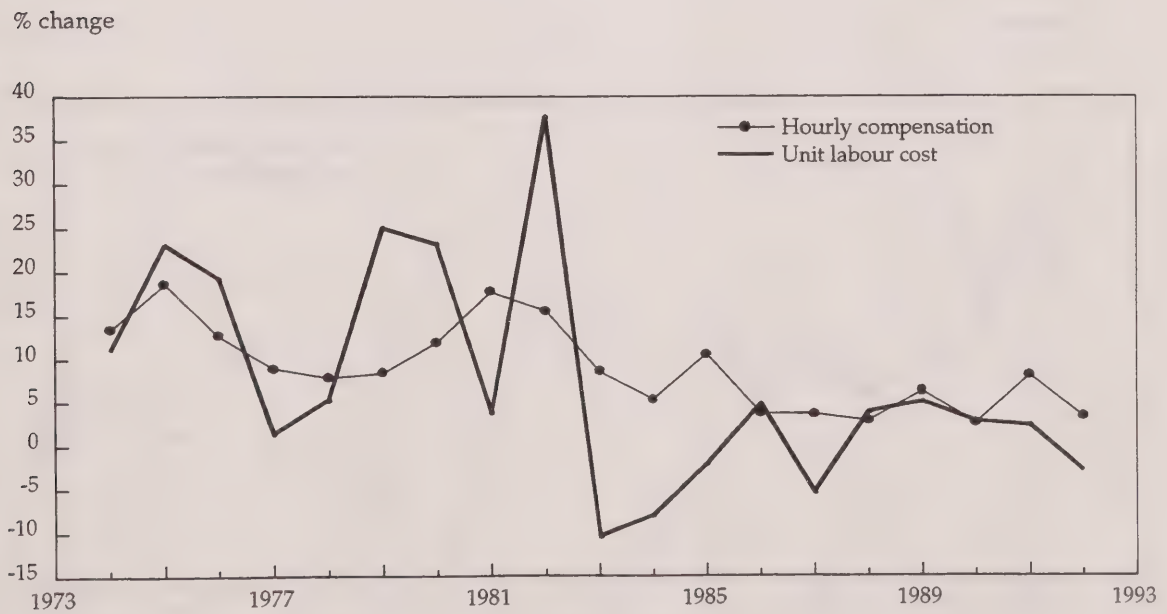


Table 26 - Fabricated metal products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	100.4	106.1	101.6	107.8	41.7	93.1	39.3	38.7	41.5
1975	91.4	104.7	101.4	106.2	46.7	86.1	44.6	44.0	51.1
1976	97.6	106.1	101.3	107.5	53.1	90.8	50.0	49.4	54.4
1977	95.9	103.1	101.4	104.5	56.4	91.7	54.7	53.9	58.8
1978	99.0	105.8	102.1	108.0	61.9	91.7	58.5	57.3	62.5
1979	102.3	110.4	100.4	110.9	70.4	92.2	63.8	63.5	68.9
1980	102.4	109.0	100.5	109.6	76.7	93.5	70.3	70.0	74.9
1981	100.6	106.1	100.2	106.4	84.3	94.6	79.4	79.2	83.8
1982	85.5	94.2	98.9	93.1	82.2	91.8	87.2	88.2	96.1
1983	80.7	87.6	98.2	86.0	81.2	93.8	92.7	94.4	100.6
1984	86.9	87.4	99.3	86.8	83.9	100.0	96.0	96.7	96.6
1985	97.6	94.5	100.6	95.1	93.3	102.7	98.8	98.2	95.6
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.9	106.5	100.4	106.8	108.2	99.2	101.6	101.3	102.1
1988	108.3	114.0	100.9	115.0	122.7	94.1	107.6	106.7	113.3
1989	112.1	122.1	99.4	121.4	135.0	92.4	110.5	111.2	120.4
1990	105.5	112.8	99.4	112.1	134.3	94.1	119.1	119.8	127.3
1991	92.8	103.6	100.0	103.6	129.5	89.6	125.0	125.0	139.5
1992	87.8	92.1	100.0	92.1	118.3	95.3	128.3	128.3	134.7

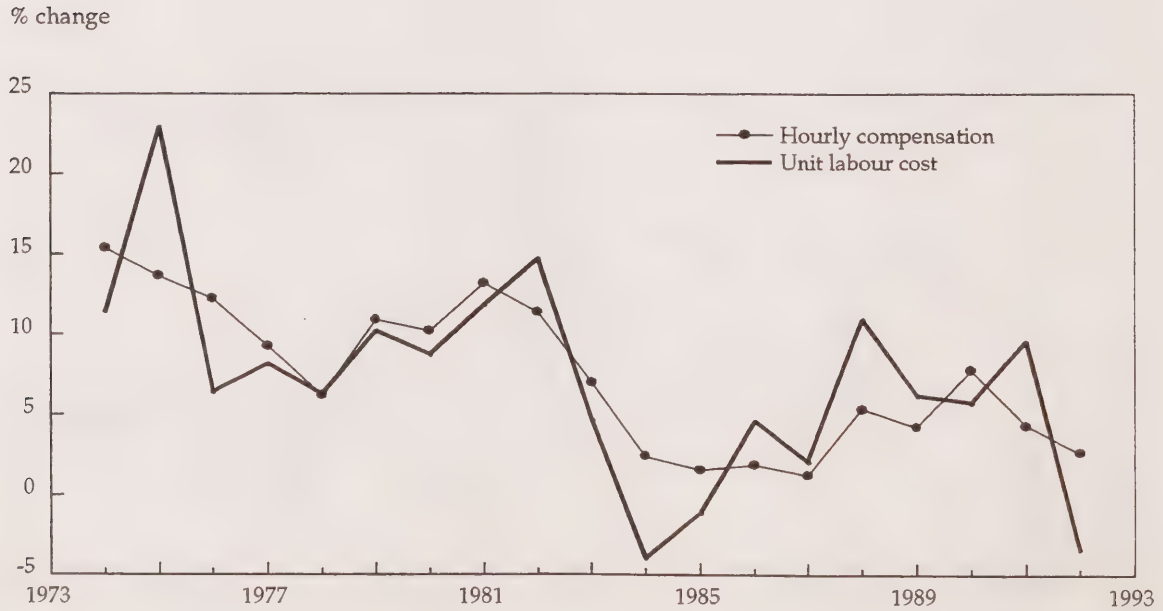


Table 27 - Machinery industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	96.7	100.9	100.7	101.6	38.1	95.1	37.8	37.5	39.4
1975	96.2	107.7	100.4	108.0	45.3	89.0	42.1	41.9	47.1
1976	97.2	104.1	100.3	104.4	49.1	93.1	47.2	47.0	50.5
1977	99.5	103.5	98.9	102.3	53.7	97.3	51.9	52.5	54.0
1978	105.0	105.7	100.2	105.9	59.8	99.1	56.6	56.5	57.0
1979	120.6	114.7	99.7	114.4	71.2	105.4	62.1	62.2	59.0
1980	122.4	121.4	99.2	120.5	83.2	101.6	68.5	69.0	68.0
1981	118.4	118.7	98.4	116.9	93.5	101.3	78.7	80.0	78.9
1982	88.2	100.4	97.8	98.1	86.2	89.9	85.9	87.9	97.8
1983	78.0	89.1	98.1	87.4	78.7	89.3	88.4	90.1	100.9
1984	94.5	93.1	99.6	92.7	86.3	102.0	92.8	93.2	91.4
1985	96.5	95.5	99.7	95.2	92.3	101.3	96.6	96.9	95.7
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	98.0	105.5	101.1	106.7	106.5	91.9	101.0	99.9	108.7
1988	109.4	116.7	100.1	116.8	122.9	93.7	105.3	105.2	112.3
1989	110.5	121.1	99.6	120.6	131.9	91.7	109.0	109.4	119.4
1990	102.1	109.0	100.7	109.8	131.1	93.0	120.3	119.5	128.4
1991	82.3	98.4	100.8	99.2	125.0	83.0	126.9	125.9	151.8
1992	76.9	93.5	101.0	94.5	121.2	81.4	129.6	128.3	157.6

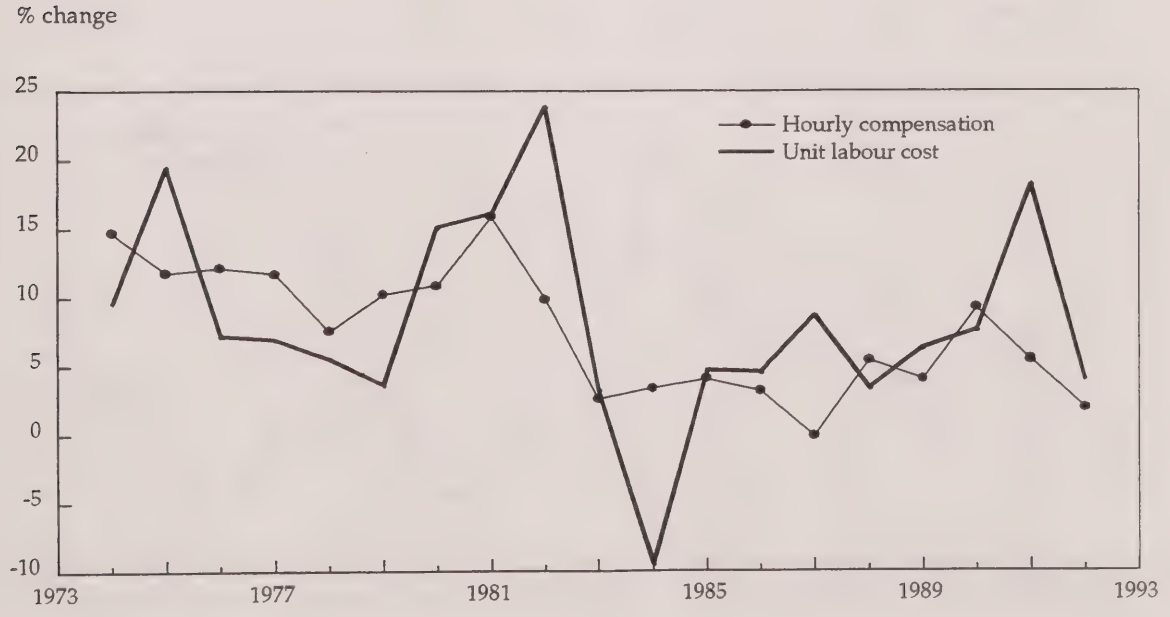


Table 28 - Transportation equipment industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	70.7	85.0	97.1	82.6	28.8	85.7	33.9	34.9	40.8
1975	72.4	79.1	97.5	77.1	30.1	94.0	38.1	39.1	41.6
1976	78.4	82.0	96.4	79.0	35.7	99.1	43.5	45.1	45.5
1977	81.5	83.0	98.3	81.5	40.4	100.0	48.7	49.6	49.5
1978	84.2	88.6	95.7	84.8	46.7	99.3	52.7	55.0	55.4
1979	84.3	93.7	93.5	87.6	52.3	96.3	55.9	59.8	62.1
1980	65.3	87.9	92.8	81.6	53.4	80.0	60.8	65.4	81.8
1981	72.0	87.9	93.6	82.3	62.3	87.5	70.9	75.7	86.5
1982	66.0	80.2	92.2	73.9	61.0	89.3	76.1	82.6	92.5
1983	75.7	80.9	95.4	77.2	67.5	98.1	83.5	87.5	89.2
1984	95.9	91.3	98.5	89.9	82.7	106.7	90.6	92.0	86.2
1985	102.6	98.4	99.0	97.4	94.6	105.3	96.1	97.2	92.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	99.6	101.9	101.3	103.2	105.5	96.4	103.6	102.2	106.0
1988	118.1	108.6	100.3	108.9	117.0	108.4	107.8	107.4	99.1
1989	124.7	112.4	96.7	108.7	123.2	114.8	109.6	113.4	98.8
1990	117.2	105.8	94.2	99.7	120.8	117.6	114.1	121.2	103.0
1991	105.5	97.2	92.7	90.0	118.5	117.1	122.0	131.7	112.4
1992	107.6	99.1	94.4	93.6	125.6	115.0	126.7	134.2	116.7

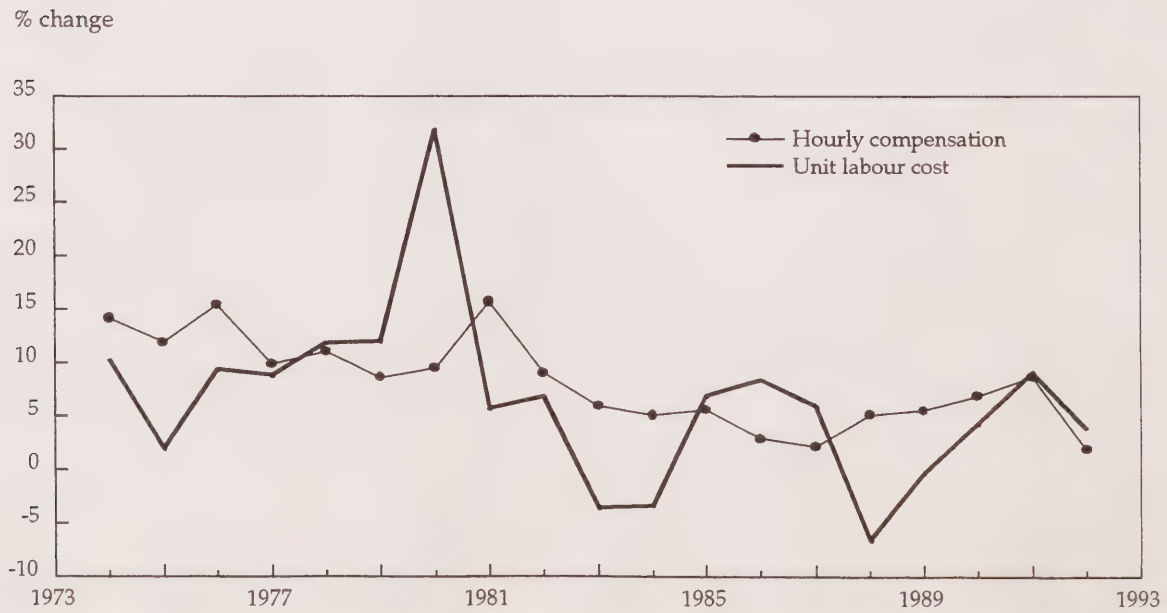


Table 29 - Electrical & electronic products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	49.4	109.1	102.2	111.5	36.7	44.3	33.6	32.9	74.3
1975	44.6	102.4	101.7	104.1	39.3	42.8	38.4	37.7	88.1
1976	47.4	99.4	100.8	100.2	43.1	47.3	43.3	43.0	90.8
1977	47.5	90.8	100.6	91.3	43.3	52.0	47.6	47.4	91.1
1978	47.7	92.9	101.3	94.1	47.6	50.6	51.3	50.6	99.9
1979	57.4	98.6	100.7	99.3	56.5	57.9	57.3	56.9	98.4
1980	64.2	101.9	100.0	101.9	63.9	63.0	62.7	62.7	99.6
1981	72.2	107.7	99.9	107.6	75.7	67.1	70.3	70.4	104.8
1982	66.6	99.3	99.7	99.0	77.9	67.3	78.5	78.7	116.9
1983	66.9	94.6	100.2	94.8	80.7	70.6	85.4	85.2	120.6
1984	86.3	100.5	99.2	99.7	90.0	86.5	89.5	90.3	104.3
1985	95.7	101.4	101.3	102.7	96.5	93.2	95.2	94.0	100.8
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	110.7	106.4	100.9	107.4	111.0	103.1	104.3	103.4	100.3
1988	119.4	111.3	99.9	111.2	120.6	107.4	108.4	108.4	101.0
1989	126.6	111.9	100.7	112.7	125.4	112.4	112.0	111.3	99.0
1990	126.8	104.6	101.0	105.6	124.7	120.1	119.2	118.0	98.3
1991	123.9	96.9	100.2	97.2	124.0	127.5	127.9	127.6	100.1
1992	131.7	94.8	101.2	95.9	127.3	137.3	134.3	132.7	96.7

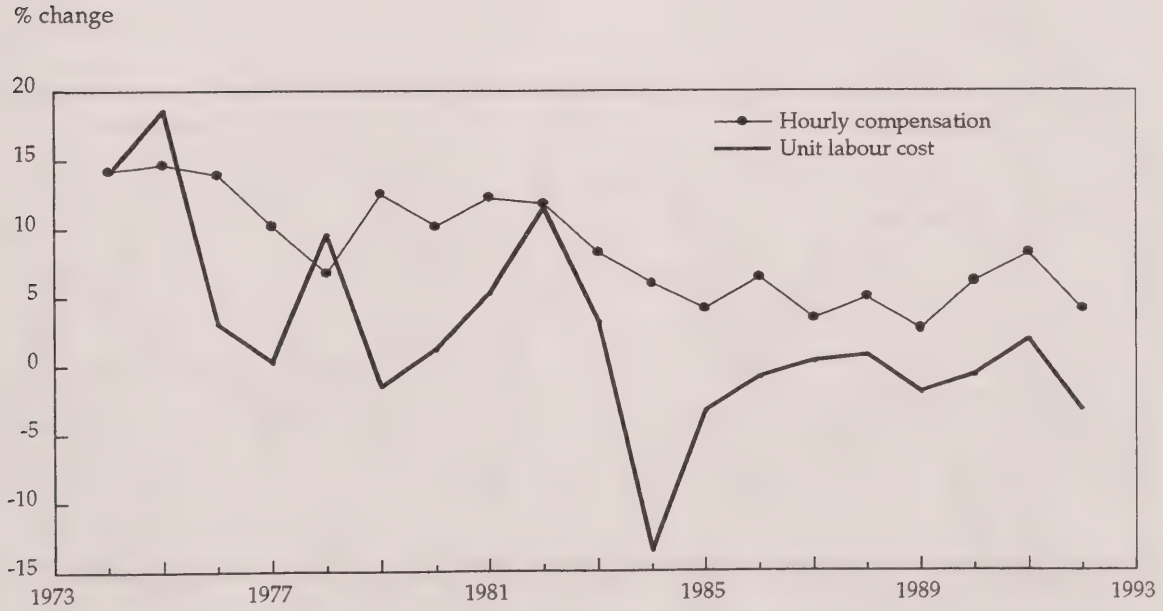


Table 30 - Non-metallic mineral products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	109.4	110.2	103.0	113.5	38.8	96.4	35.2	34.1	35.4
1975	101.9	107.5	103.0	110.7	43.5	92.1	40.4	39.3	42.7
1976	104.8	106.4	101.9	108.4	49.1	96.6	46.1	45.3	46.8
1977	100.8	102.0	102.0	104.0	52.5	96.9	51.4	50.4	52.1
1978	108.1	104.6	101.7	106.4	57.9	101.6	55.3	54.4	53.5
1979	111.8	106.6	101.3	108.0	64.8	103.5	60.8	60.0	58.0
1980	98.2	105.0	99.0	104.0	69.2	94.4	65.9	66.6	70.5
1981	94.5	104.5	98.5	102.9	77.9	91.8	74.6	75.7	82.5
1982	72.4	90.7	97.3	88.2	73.8	82.1	81.4	83.7	102.0
1983	80.2	88.9	99.0	88.0	77.1	91.1	86.7	87.6	96.1
1984	87.8	91.4	99.7	91.2	82.6	96.3	90.4	90.6	94.1
1985	95.8	94.6	99.5	94.2	90.9	101.7	96.1	96.6	94.9
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	109.6	106.2	101.5	107.8	109.7	101.7	103.3	101.7	100.1
1988	111.3	108.1	102.3	110.5	116.6	100.7	107.9	105.5	104.7
1989	108.7	107.2	102.6	110.0	119.0	98.8	111.0	108.1	109.4
1990	97.5	102.2	101.4	103.6	117.6	94.1	115.1	113.4	120.6
1991	81.2	92.3	100.7	92.9	109.2	87.4	118.2	117.5	134.5
1992	80.4	84.1	101.4	85.2	103.8	94.3	123.5	121.8	129.2

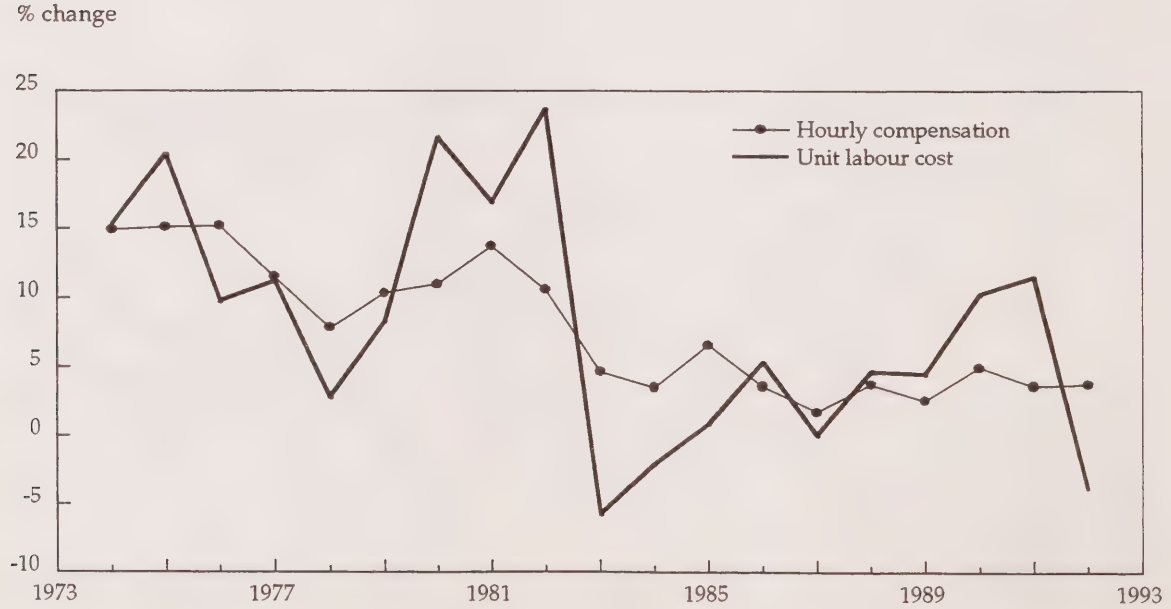


Table 31 - Refined petroleum & coal products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	105.0	115.0	98.4	113.2	35.4	92.8	30.8	31.3	33.7
1975	113.4	113.0	95.9	108.4	41.6	104.7	36.8	38.4	36.7
1976	106.0	112.4	95.1	107.0	46.5	99.1	41.3	43.5	43.9
1977	132.2	119.9	94.8	113.7	54.6	116.3	45.5	48.0	41.3
1978	118.9	137.2	95.6	131.1	64.6	90.6	47.0	49.2	54.3
1979	97.9	126.5	96.5	122.2	65.6	80.1	51.8	53.7	67.0
1980	96.1	131.8	95.5	125.9	75.4	76.3	57.2	59.9	78.5
1981	111.3	153.1	95.9	146.9	100.7	75.8	65.8	68.5	90.5
1982	103.2	146.4	93.9	137.5	116.1	75.0	79.3	84.5	112.6
1983	102.7	125.7	100.6	126.5	111.6	81.2	88.8	88.3	108.8
1984	103.5	114.5	101.4	116.1	107.7	89.2	94.1	92.8	104.0
1985	100.8	111.9	102.6	114.8	107.5	87.8	96.0	93.6	106.6
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	105.3	98.4	102.2	100.5	104.8	104.8	106.6	104.3	99.5
1988	108.0	101.8	98.6	100.4	107.7	107.6	105.8	107.3	99.7
1989	112.7	111.6	99.5	111.0	122.4	101.6	109.7	110.3	108.6
1990	119.8	100.7	99.5	100.2	114.1	119.6	113.3	113.9	95.2
1991	118.1	93.1	99.2	92.4	111.4	127.9	119.7	120.6	94.3
1992	115.1	87.2	100.0	87.1	106.2	132.2	121.8	121.9	92.2

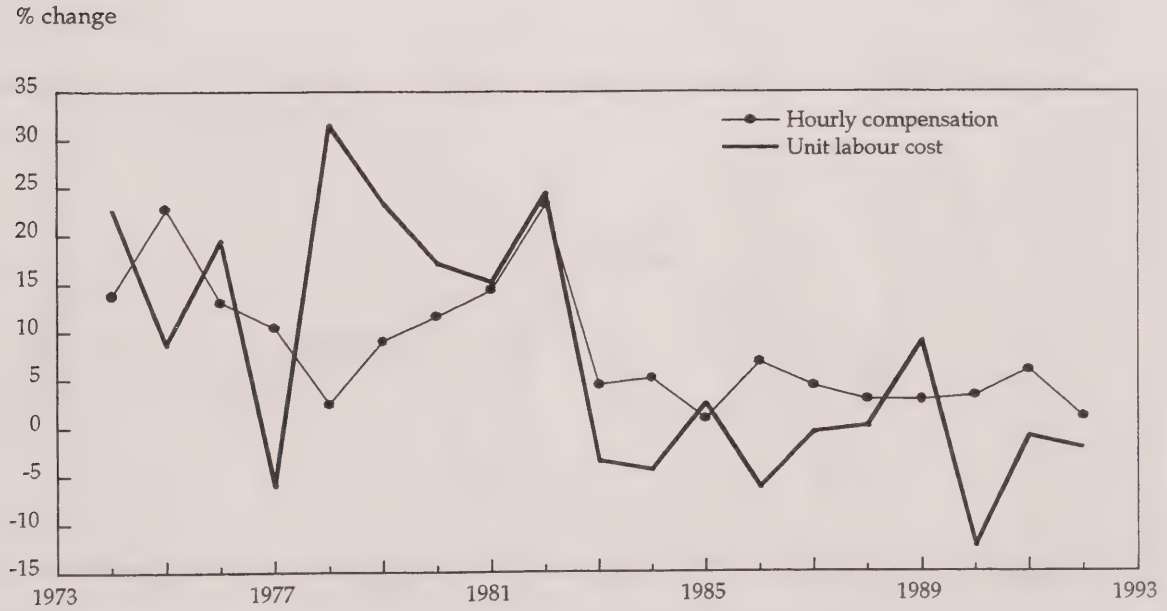


Table 32 - Chemical & chemical products industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	65.3	93.1	100.4	93.5	30.7	69.8	33.0	32.9	47.1
1975	58.5	93.6	100.8	94.3	34.9	62.0	37.3	37.0	59.6
1976	64.7	92.8	95.8	89.0	38.7	72.7	41.6	43.5	59.8
1977	70.5	95.3	100.7	96.0	44.1	73.5	46.3	46.0	62.5
1978	78.7	96.7	100.9	97.6	48.4	80.6	50.1	49.6	61.6
1979	84.4	99.9	99.3	99.2	54.7	85.0	54.8	55.2	64.9
1980	79.4	99.5	99.0	98.5	61.4	80.6	61.7	62.4	77.4
1981	85.9	102.6	98.5	101.1	72.5	85.0	70.6	71.7	84.3
1982	76.4	101.3	97.4	98.7	78.5	77.4	77.5	79.5	102.8
1983	89.9	100.1	99.9	100.0	82.9	89.9	82.8	82.9	92.2
1984	98.4	100.2	100.2	100.4	89.1	98.0	88.9	88.7	90.5
1985	99.5	99.8	99.8	99.5	93.7	100.0	93.9	94.1	94.1
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	107.1	101.7	99.3	101.1	106.4	105.9	104.6	105.3	99.4
1988	114.5	107.4	100.7	108.1	115.5	105.9	107.6	106.9	100.9
1989	118.7	108.0	101.1	109.2	120.2	108.7	111.3	110.1	101.2
1990	118.9	107.5	100.9	108.5	127.0	109.6	118.1	117.0	106.8
1991	108.3	103.5	100.6	104.1	128.6	104.0	124.2	123.5	118.8
1992	113.2	102.9	101.7	104.6	130.9	108.2	127.2	125.2	115.7

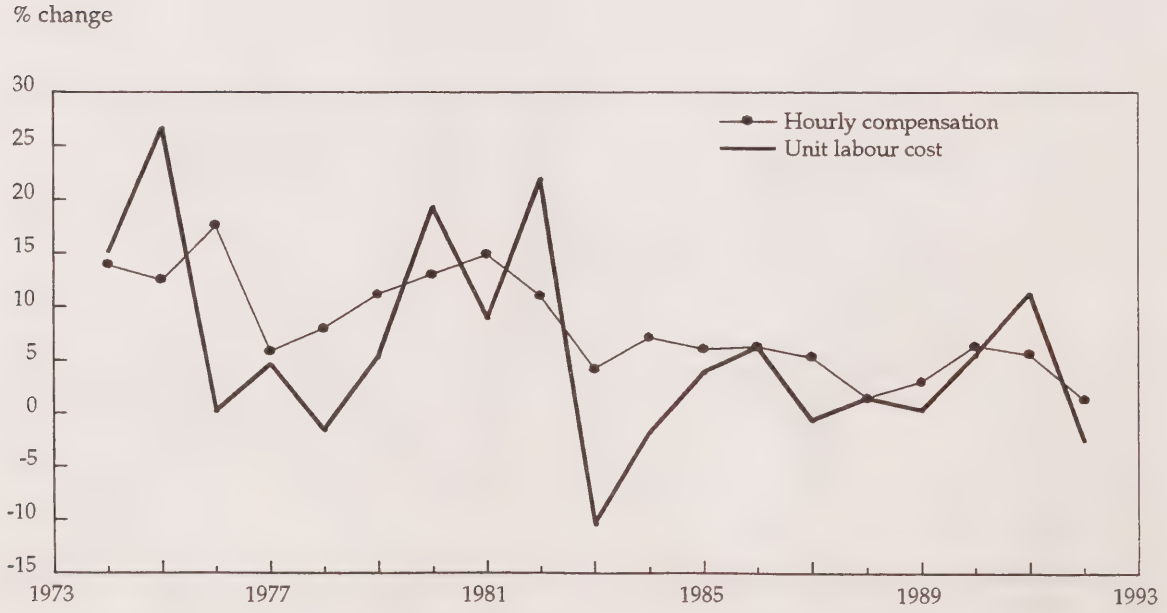
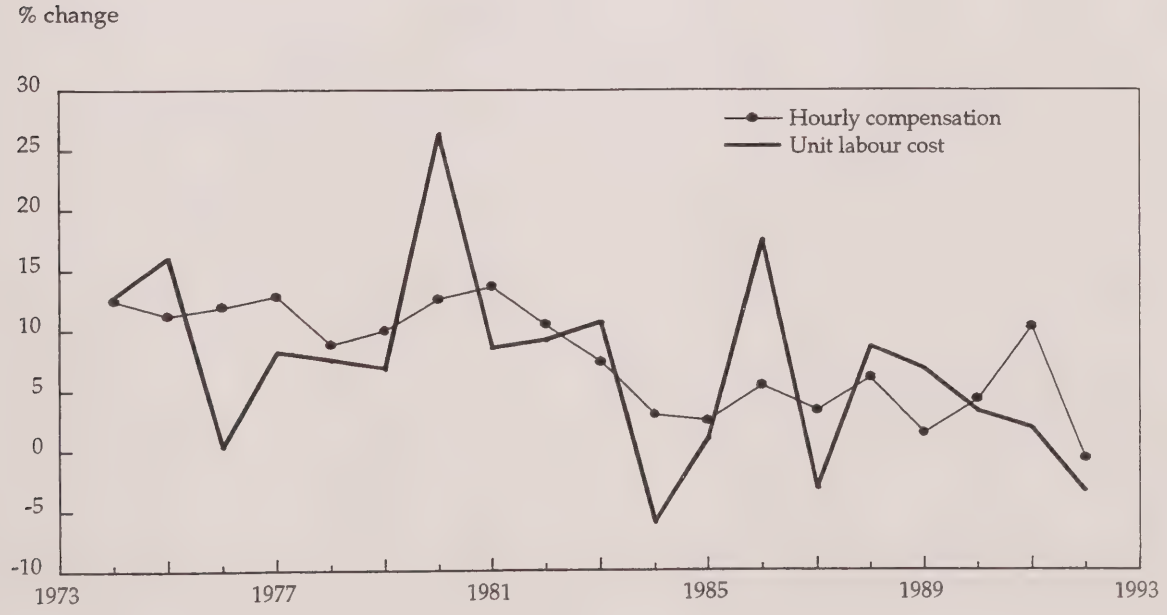


Table 33 - Other manufacturing industries (1986=100)

Year	Real gross domestic product	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour unit
1974	92.5	94.0	104.0	97.8	34.5	94.6	36.7	35.3	37.3
1975	88.3	94.2	103.3	97.3	38.2	90.7	40.6	39.3	43.3
1976	98.7	95.9	101.8	97.7	42.9	101.1	44.8	44.0	43.5
1977	96.2	89.9	101.5	91.2	45.3	105.4	50.4	49.6	47.1
1978	99.3	92.0	101.3	93.2	50.3	106.6	54.6	54.0	50.6
1979	105.1	94.3	101.6	95.8	56.8	109.7	60.3	59.3	54.1
1980	93.0	94.3	100.9	95.2	63.6	97.8	67.4	66.8	68.3
1981	100.9	97.8	100.9	98.6	74.8	102.3	76.6	75.9	74.2
1982	93.9	91.2	99.5	90.8	76.1	103.4	83.4	83.8	81.1
1983	91.0	90.4	100.4	90.7	81.6	100.3	90.3	90.0	89.7
1984	103.7	93.2	101.3	94.4	87.5	109.9	93.9	92.6	84.3
1985	109.4	95.9	102.4	98.1	93.1	111.5	97.2	94.9	85.2
1986	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1987	104.6	99.4	98.6	98.0	101.3	106.6	101.9	103.3	96.9
1988	109.6	106.9	98.6	105.3	115.3	104.1	107.9	109.5	105.2
1989	109.1	108.5	101.7	110.4	122.5	98.9	112.9	111.0	112.2
1990	108.2	106.7	101.7	108.5	125.4	99.7	117.5	115.6	115.9
1991	108.3	100.8	99.4	100.3	127.7	108.0	126.7	127.4	118.0
1992	106.6	94.9	101.1	95.9	121.3	111.1	127.8	126.4	113.8



PART 3

Miscellaneous Tables

Table 1 - Productivity indices by final demand category, (1961=100)

	1962	1967	1972	1977	1982	1987	1992
Personal expenditure on durable goods	107.4	128.9	154.5	164.0	157.8	183.7	173.3
Personal expenditure on semi-durable goods	106.0	117.8	138.2	152.4	150.3	174.6	163.5
Personal expenditure on non-durable goods	107.7	121.3	141.5	149.2	141.5	158.7	152.1
Personal expenditure on services	97.9	95.9	103.4	103.2	94.2	98.0	92.3
Business construction	103.7	110.0	124.3	134.2	150.0	152.3	147.0
Government construction	105.0	112.7	126.7	135.7	155.2	157.1	151.7
Business machinery & equipment	107.8	126.8	150.1	164.1	159.7	184.2	172.6
Government machinery & equipment	107.1	124.3	143.9	154.7	149.5	170.6	168.0
Inventories	109.3	118.0	135.3	139.6	129.6	157.8	153.3
Domestic exports	104.4	115.2	134.2	138.5	121.7	149.8	141.1
Government current expenditure	103.4	111.9	124.9	130.8	127.1	133.7	129.2
Business sector	104.3	113.3	129.3	135.4	129.4	144.2	136.9

Table 2 - Percentage distribution of net final sales by final demand category

	1962	1967	1972	1977	1982	1987	1992
Personal expenditure on durable goods	6.93	6.56	6.47	5.80	5.04	5.67	5.18
Personal expenditure on semi-durable goods	7.63	6.89	6.51	5.93	5.56	5.31	4.39
Personal expenditure on non-durable goods	21.11	18.59	17.02	15.53	16.53	15.28	14.92
Personal expenditure on services	18.34	19.22	19.24	19.16	19.62	20.95	22.42
Business construction	11.88	12.62	13.24	15.08	13.73	13.73	12.15
Government construction	4.20	4.16	3.74	3.10	2.82	2.16	2.20
Business machinery & equipment	4.21	5.12	4.17	4.08	4.18	3.16	2.89
Government machinery & equipment	0.33	0.32	0.25	0.25	0.22	0.23	0.25
Inventories	2.24	1.58	1.50	1.53	0.71	0.74	0.47
Domestic exports	18.16	19.53	21.27	22.42	23.30	24.65	25.38
Government current expenditure	4.96	5.40	6.59	7.10	8.28	8.13	9.75

Table 3 - Productivity growth contributions by final demand category

	1962	1967	1972	1977	1982	1987	1992
Personal expenditure on durable goods	0.49	0.16	0.34	0.04	-0.21	0.09	0.00
Personal expenditure on semi-durable goods	0.44	-0.05	0.30	0.11	-0.24	0.17	-0.02
Personal expenditure on non-durable goods	1.57	-0.54	0.40	0.13	-0.44	0.33	-0.07
Personal expenditure on services	-0.40	-0.48	0.33	-0.08	-1.22	-0.27	-0.13
Business construction	0.45	-0.06	0.16	0.38	-0.13	-0.05	0.03
Government construction	0.20	-0.02	0.03	0.08	0.03	0.00	0.01
Business machinery & equipment	0.31	-0.06	0.19	0.06	-0.35	0.02	0.01
Government machinery & equipment	0.02	-0.00	0.01	0.01	-0.02	0.00	0.00
Inventories	0.17	-0.13	0.04	0.01	-0.07	0.02	0.01
Domestic exports	0.76	-0.61	0.96	0.11	-1.41	0.72	0.32
Government current expenditure	0.17	-0.07	0.11	0.02	-0.33	0.02	0.00

Table 4 - Productivity indices of exports by commodity groups (1961=100)

Commodities	1962	1967	1972	1977	1982	1987	1992
Grains	120.3	123.1	139.1	143.9	162.1	188.9	201.4
Other agricultural products	120.3	123.1	139.2	144.0	165.7	193.6	210.1
Forestry products	105.4	113.1	152.3	157.8	166.1	244.4	225.7
Fishing & trapping products	96.2	83.3	86.0	93.0	87.0	104.5	109.8
Metallic ores & concentrates	103.2	115.1	112.9	106.1	85.8	128.6	131.4
Minerals fuels	99.1	106.2	141.6	103.3	41.6	45.2	45.3
Non-metallic minerals	98.0	115.0	113.9	93.1	59.1	68.0	65.3
Meat, fish & dairy products	107.5	102.3	112.3	114.6	119.9	133.5	146.9
Fruit,veg.,feed,misc.food prod	108.2	121.7	142.5	152.4	156.3	173.5	177.2
Beverages	103.9	153.4	153.5	190.4	162.3	158.7	141.3
Tobacco & tobacco products	114.4	120.0	153.7	179.2	180.0	181.5	161.7
Rubber, leather, plastic fab.pro	111.2	124.6	144.9	163.1	158.2	195.6	190.1
Textile products	112.3	115.8	160.6	180.9	204.0	283.8	266.6
Knitted products & clothing	107.1	113.1	137.3	163.2	173.3	202.4	199.9
Lumber, sawmill, other wood prod	105.5	121.4	137.7	153.1	167.9	242.1	232.2
Furniture & fixtures	105.3	119.2	142.5	148.8	130.0	146.4	142.6
Paper & paper products	100.3	98.9	116.9	120.7	108.9	141.1	123.2
Printing & publishing	102.2	105.0	115.9	137.6	130.8	143.2	115.3
Primary metal products	101.2	106.4	106.5	109.2	88.1	130.7	123.0
Metal fabricated products	110.5	125.4	142.1	148.3	136.5	170.4	163.3
Machinery & equipment	108.4	124.7	123.0	139.2	139.2	198.7	174.8
Autos, trucks, other transp. eqp	108.5	130.4	172.8	214.4	204.3	250.0	222.6
Elec. & communications prod.	110.6	116.5	147.2	175.0	191.0	207.3	216.9
Non-metallic mineral products	109.0	128.5	166.7	168.5	128.5	185.3	151.5
Petroleum & coal products	109.2	126.5	157.2	128.2	67.9	72.1	71.2
Chemicals, chemical prod	108.2	129.0	149.1	157.4	146.0	192.2	176.6
Misc. manufactured products	104.3	110.3	136.1	151.4	168.2	182.4	179.5
Transportation & storage	102.0	141.8	189.1	190.6	168.4	201.3	173.2
Communication services	101.7	112.2	132.5	161.1	205.5	255.3	272.9
Other utilities	101.8	120.0	142.2	151.9	145.2	170.5	149.0
Wholesale margins	105.0	124.5	145.4	151.2	157.8	188.2	178.9
Other finance,ins.,real estate	91.2	82.2	83.0	82.4	78.1	96.7	89.1
Business services	96.8	101.4	110.7	108.2	109.4	111.2	103.2
Personal & other misc. service	98.7	94.6	109.0	111.3	103.9	106.5	96.7
Transportation margins	100.9	126.3	165.4	169.1	176.8	227.2	220.7
Domestic exports	104.4	115.2	134.2	138.5	121.7	149.8	141.1

Table 5 - Percentage distribution of domestic exports by commodity groups

Commodities	1962	1967	1972	1977	1982	1987	1992
Grains	8.23	5.38	3.46	4.87	6.43	2.20	2.31
Other agricultural products	2.76	1.71	1.64	1.79	1.70	1.52	1.99
Forestry products	0.63	0.45	0.16	0.16	0.16	0.30	0.11
Fishing & trapping products	0.61	0.42	0.41	0.28	0.35	0.53	0.35
Metallic ores & concentrates	9.00	6.48	5.17	5.49	5.05	4.76	3.26
Mineral fuels	4.13	3.92	6.20	7.66	9.28	6.48	6.70
Non-metallic minerals	2.50	2.27	1.43	1.74	1.18	0.80	0.51
Meat, fish & dairy products	3.16	2.80	2.80	2.98	3.66	3.27	2.61
Fruit, veg., feed, misc. food products	1.74	1.55	1.15	1.28	1.31	1.23	1.51
Beverages	1.40	1.44	1.16	0.87	0.68	0.51	0.68
Tobacco & tobacco products	0.49	0.44	0.26	0.16	0.15	0.10	0.36
Rubber, leather, plastic fab. products	0.42	0.39	0.46	0.61	0.86	1.23	1.53
Textile products	0.56	0.41	0.41	0.35	0.41	0.53	0.68
Knitted products & clothing	0.16	0.27	0.36	0.27	0.29	0.37	0.53
Lumber, sawmill, other wood products	6.71	5.32	6.77	6.99	4.43	5.58	4.94
Furniture & fixtures	0.05	0.08	0.23	0.22	0.41	0.72	0.65
Paper & paper products	17.09	13.41	10.94	11.62	10.15	11.29	7.85
Printing & publishing	0.10	0.16	0.22	0.25	0.35	0.54	0.41
Primary metal products	13.89	13.36	9.65	8.10	5.71	6.59	5.84
Metal fabricated products	0.68	1.02	1.59	1.58	1.43	1.69	1.45
Machinery & equipment	2.41	3.30	3.77	3.40	3.43	3.77	3.39
Auto, trucks, other transp. equipment	2.85	12.81	17.92	16.48	13.86	17.48	16.27
Elec. & communications products	1.33	2.15	2.47	1.86	2.61	3.30	3.65
Non-metallic mineral products	0.51	0.43	0.76	0.56	0.63	0.87	0.64
Petroleum & coal products	0.22	0.29	0.90	1.62	2.98	1.62	1.64
Chemicals, chemical products	2.85	3.02	2.63	2.91	3.53	3.77	4.27
Misc. manufactured products	0.73	0.83	1.10	0.71	1.45	1.74	2.06
Transportation & storage	4.22	4.36	3.62	2.61	2.77	1.92	3.53
Communication services	0.21	0.25	0.27	0.30	0.40	0.52	0.54
Other utilities	0.27	0.16	0.38	1.12	1.74	1.18	0.57
Wholesale margins	2.20	3.15	3.56	3.24	3.81	4.19	4.80
Other finance, ins., real estate	0.50	0.43	0.53	0.51	0.72	1.19	1.75
Business services	1.15	1.32	1.36	1.60	2.26	2.36	3.63
Personal & other misc. services	0.10	0.51	0.35	0.32	0.35	0.53	4.10
Transportation margins	6.11	5.73	5.93	5.49	5.49	5.31	4.85
Total exports	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 6 - Productivity growth contributions to total exports, by commodity groups

Commodities	1962	1967	1972	1977	1982	1987	1992
Grains	1.256	-1.219	-0.214	-0.129	0.018	-0.007	-0.006
Other agricultural products	0.508	-0.344	-0.098	-0.036	0.019	-0.009	-0.004
Forestry products	0.035	-0.014	0.017	0.005	-0.003	0.008	0.002
Fishing & trapping products	-0.023	-0.018	-0.009	0.022	0.041	-0.023	0.018
Metallic ores & concentrates	0.285	0.216	-0.066	-0.273	-0.161	0.436	0.116
Mineral fuels	-0.032	0.016	0.710	-0.454	-0.924	0.547	0.329
Non-metallic minerals	-0.051	-0.037	-0.032	-0.124	-0.255	0.067	-0.001
Meat, fish & dairy products	0.237	-0.219	-0.051	0.096	0.244	-0.092	-0.009
Fruit, veg., feed, misc. food products	0.131	-0.067	0.022	0.004	-0.017	0.001	0.014
Beverages	0.056	0.028	-0.010	0.071	-0.067	0.005	0.009
Tobacco & tobacco products	0.064	-0.065	-0.003	0.014	-0.003	0.007	-0.009
Rubber, leather, plastic fab. products	0.043	-0.007	0.014	0.046	-0.067	0.044	0.090
Textile products	0.064	0.000	0.038	0.026	-0.057	0.006	0.015
Knitted products & clothing	0.010	-0.006	0.019	0.013	-0.020	0.004	0.002
Lumber, sawmill, other wood products	0.354	0.065	-0.012	0.340	-0.079	0.299	0.078
Furniture & fixtures	0.002	-0.002	0.017	0.006	-0.066	-0.037	0.026
Paper & paper products	0.045	-0.989	0.664	0.027	-1.121	0.431	0.089
Printing & publishing	0.002	-0.001	0.011	0.011	-0.029	-0.010	-0.019
Primary metal products	0.179	-0.640	0.659	0.214	-0.497	0.544	0.179
Metal fabricated products	0.062	-0.028	0.056	0.022	-0.151	0.017	0.033
Machinery & equipment	0.190	-0.121	0.159	0.082	-0.339	0.104	-0.043
Transportation equipment	0.211	0.666	1.397	0.457	-0.531	-0.561	-0.014
Elec. & communications products	0.118	-0.177	0.255	0.084	-0.236	0.058	0.160
Non-metallic mineral products	0.047	-0.019	0.061	-0.009	-0.080	0.048	0.022
Petroleum & coal products	0.018	-0.007	0.064	-0.025	-0.258	0.118	0.071
Chemicals, chemical products	0.243	-0.104	0.180	0.008	-0.539	0.211	0.079
Misc. manufactured products	0.030	-0.045	0.092	0.020	-0.082	0.039	0.016
Transportation & storage	0.083	0.085	0.279	0.135	-0.140	0.162	-0.021
Communication services	0.005	0.000	0.011	0.002	-0.006	0.013	0.010
Other utilities	0.005	0.002	0.027	-0.007	-0.101	0.040	-0.021
Wholesale margins	0.112	0.042	0.099	-0.088	-0.193	0.075	0.002
Other finance, ins., real estate	-0.052	-0.001	0.016	-0.008	-0.038	0.013	-0.025
Business services	-0.036	-0.068	0.022	-0.047	-0.020	0.057	0.016
Personal & other misc. services	-0.001	-0.005	0.010	-0.001	-0.021	-0.007	0.025
Transportation margins	0.060	-0.025	0.134	-0.005	-0.080	0.292	0.058
Domestic exports growth	0.764	-0.608	0.962	0.110	-1.405	0.717	0.317

Table 7 - Multifactor productivity indices for comparable manufacturing industries in Canada and the United States, (1961=100)

Year	Total manufacturing industries		Food & beverage industries		Plastic & rubber products industries		Leather & allied products industries	
	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1962	104.2	104.2	101.5	102.5	108.6	102.4	103.5	102.2
1963	106.5	107.7	102.1	104.0	110.7	103.2	104.3	103.9
1964	109.2	110.8	103.1	104.5	113.2	105.9	107.4	107.1
1965	111.2	113.9	104.4	105.7	114.8	107.2	106.9	106.8
1966	111.5	114.5	104.8	106.6	117.0	107.9	106.6	102.9
1967	110.2	114.2	106.1	107.3	116.0	110.4	106.2	105.8
1968	112.9	117.1	105.7	108.5	122.1	114.5	106.9	108.6
1969	115.8	118.6	106.4	109.8	124.1	117.3	108.4	107.8
1970	114.5	116.8	106.9	110.0	121.0	113.8	109.2	108.5
1971	117.2	120.3	109.7	110.7	123.1	119.5	111.0	109.3
1972	120.7	125.1	110.1	114.0	125.8	122.6	110.7	104.4
1973	124.6	128.2	112.0	111.4	130.0	125.0	112.2	110.3
1974	124.7	122.2	111.5	106.0	124.1	115.0	113.2	114.9
1975	121.0	119.3	109.3	106.9	119.1	112.1	113.7	118.4
1976	124.8	123.9	112.4	111.1	124.2	112.4	119.1	116.8
1977	127.7	126.3	114.1	108.9	130.3	115.2	120.6	114.7
1978	128.9	128.2	114.0	112.2	134.0	115.7	128.2	112.8
1979	129.2	127.8	114.1	112.9	138.6	114.0	126.3	105.4
1980	127.3	126.2	112.8	114.3	135.7	113.5	124.7	114.6
1981	129.4	128.0	112.5	114.5	136.5	117.1	127.8	113.3
1982	125.3	129.7	112.4	121.1	133.3	119.7	124.5	115.2
1983	129.8	132.9	111.6	121.7	140.2	122.8	128.2	114.0
1984	134.9	137.2	112.8	122.1	148.4	124.5	131.8	113.9
1985	136.7	139.2	114.1	123.2	149.3	129.2	132.0	113.1
1986	136.0	141.8	113.3	121.3	142.8	128.5	132.3	109.0
1987	136.5	146.0	113.2	123.3	144.6	132.1	132.6	114.7
1988	136.3	146.8	111.3	123.5	141.5	128.5	130.8	113.6
1989	135.3	146.3	110.3	122.9	139.7	130.9	132.0	114.8
1990	132.8	145.7	109.8	121.9	137.3	131.7	128.5	100.5
1991	130.4	145.5	109.9	123.3	133.7	133.7	124.0	97.0
1992	131.0	149.5	110.4	127.0	139.9	135.7	125.9	101.4

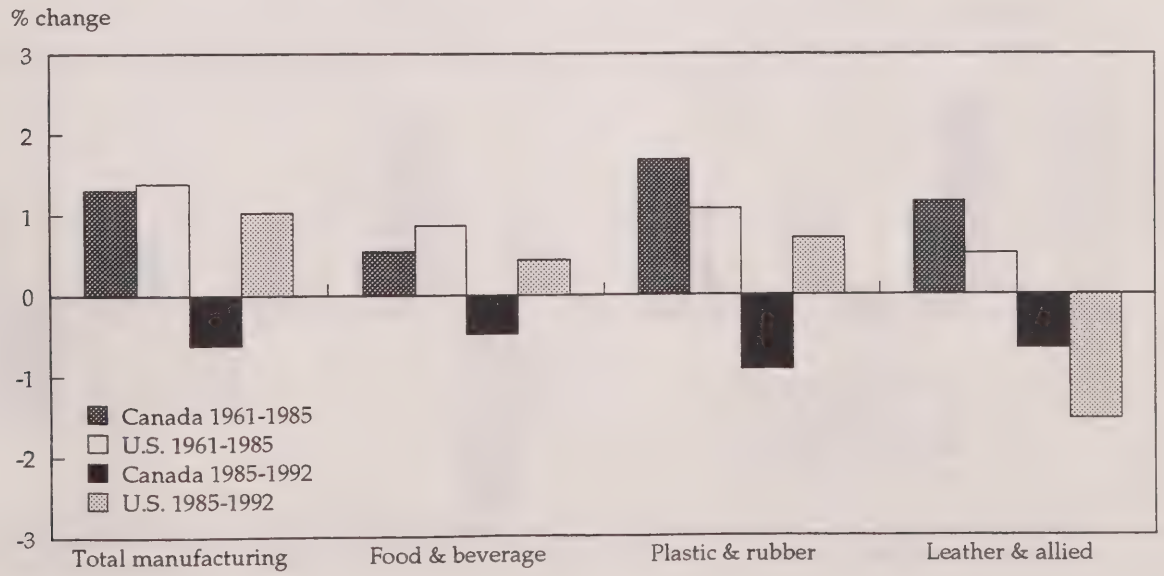


Table 7 - Multifactor productivity indices for comparable manufacturing industries in Canada and the United States, (1961=100), continued

Year	Textile & textile products industries		Clothing industries		Wood & lumber industries		Furniture & fixtures industries	
	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1962	108.2	102.3	102.4	101.2	103.0	103.9	101.7	100.9
1963	112.5	103.9	103.9	102.1	108.3	109.7	104.6	101.0
1964	113.6	107.1	104.1	103.5	109.8	112.1	104.3	102.3
1965	110.5	110.7	105.3	104.0	109.1	114.8	107.5	104.9
1966	108.9	114.2	106.1	103.9	110.1	112.0	109.0	104.6
1967	108.6	115.6	104.7	105.9	110.4	117.8	108.7	103.1
1968	116.4	116.6	106.7	108.2	116.3	117.5	110.4	104.5
1969	121.9	120.4	106.5	108.5	119.0	111.5	113.5	106.5
1970	120.3	126.5	106.3	108.4	120.5	120.4	110.4	102.9
1971	126.0	129.0	109.3	109.8	121.3	119.8	111.9	104.4
1972	134.3	130.4	111.4	113.0	122.6	121.2	119.4	110.6
1973	135.9	129.2	114.3	113.6	123.3	116.9	123.4	110.9
1974	137.0	124.6	114.4	115.3	122.3	117.2	112.6	107.8
1975	137.4	130.1	116.4	119.1	117.8	123.2	110.9	108.1
1976	141.7	130.8	119.8	119.7	124.7	122.5	116.8	111.8
1977	148.7	138.6	122.4	122.3	130.1	120.6	118.1	113.7
1978	156.0	142.2	127.2	125.8	129.9	116.5	123.1	114.7
1979	162.1	146.3	130.0	127.1	129.9	116.2	120.1	112.6
1980	162.7	147.7	129.6	127.7	135.5	119.6	118.5	116.1
1981	167.3	148.5	130.5	128.3	138.4	118.6	120.1	116.3
1982	157.0	155.7	126.8	130.0	136.4	124.6	108.3	117.2
1983	173.4	159.2	125.5	132.2	147.3	127.7	115.4	118.0
1984	174.9	160.4	128.8	132.9	158.6	134.8	118.0	119.1
1985	177.0	161.5	130.8	136.1	164.4	136.6	119.1	119.7
1986	183.5	164.1	132.8	138.6	168.0	141.9	116.7	119.1
1987	183.3	164.7	133.7	140.4	173.1	147.4	110.9	120.8
1988	179.1	164.2	130.7	141.6	171.3	146.8	107.9	118.5
1989	176.0	167.0	130.9	144.0	168.5	146.5	107.8	117.8
1990	172.9	167.8	129.9	144.7	164.7	145.6	106.5	115.9
1991	169.9	168.5	128.7	144.7	162.5	145.6	103.4	115.6
1992	173.2	175.4	129.0	145.5	165.6	145.1	107.8	118.3

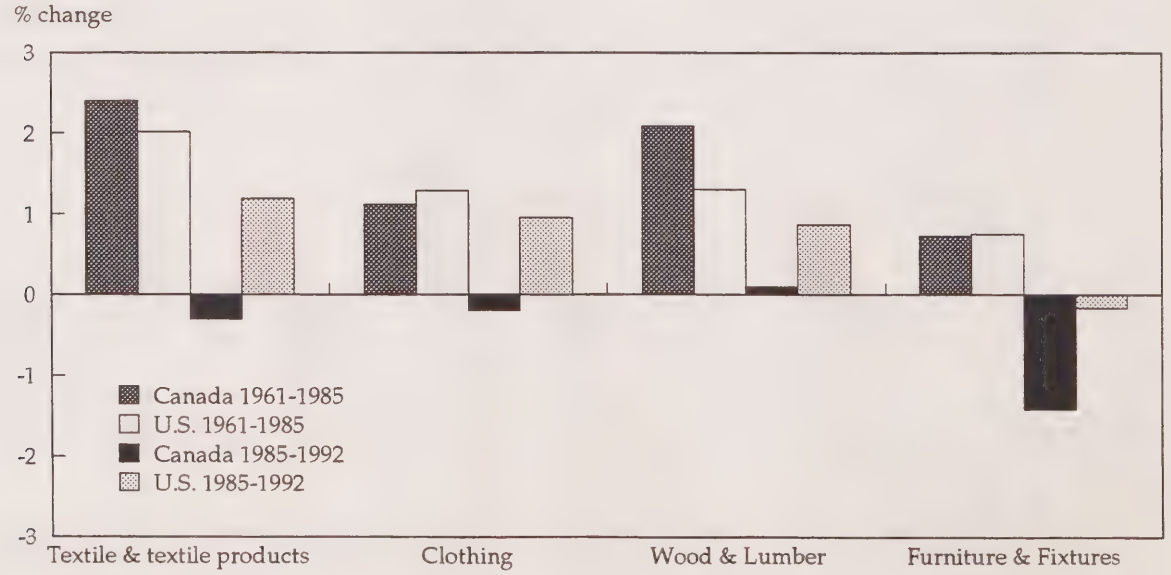


Table 7 - Multifactor productivity indices for comparable manufacturing industries in Canada and the United States, (1961=100), continued

Year	Paper & allied products industries		Printing publishing & allied industries		Primary metal industries		Machinery, electrical electronic products ind.	
	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1962	100.0	101.6	102.0	101.5	102.6	103.4	107.2	104.3
1963	101.5	104.6	102.2	100.8	103.7	106.6	108.8	106.6
1964	104.0	107.4	101.8	104.0	105.9	109.1	113.4	111.3
1965	102.4	108.7	101.2	105.5	108.2	110.8	115.8	115.2
1966	101.6	109.3	102.2	106.0	107.8	111.9	117.2	116.7
1967	97.2	107.0	102.5	105.4	104.7	109.3	113.2	115.4
1968	98.0	111.3	103.3	106.3	108.7	109.9	115.3	115.9
1969	100.9	113.6	104.0	106.3	109.8	108.0	119.1	118.7
1970	100.7	110.3	102.7	102.3	108.9	104.4	117.9	118.7
1971	100.6	114.2	103.7	103.6	108.5	106.0	115.2	120.3
1972	103.8	119.4	107.1	106.2	110.5	109.2	119.7	127.2
1973	107.2	124.7	111.3	107.4	113.0	113.4	124.5	133.2
1974	109.7	118.9	111.0	105.0	114.0	110.0	125.1	129.2
1975	96.7	111.4	112.4	101.4	110.9	102.1	121.8	124.3
1976	103.7	115.5	118.9	102.2	107.7	102.3	125.4	131.5
1977	103.4	117.5	123.4	104.7	111.8	100.5	129.3	139.5
1978	105.7	119.9	125.9	104.8	113.6	102.8	129.6	143.3
1979	106.8	118.1	125.5	105.4	108.7	101.3	137.5	146.3
1980	105.3	114.4	125.4	103.1	106.0	101.9	140.0	148.8
1981	104.8	114.3	126.7	103.4	109.7	104.7	139.6	153.2
1982	98.1	118.0	120.5	102.7	102.8	100.4	131.8	151.5
1983	103.1	122.2	123.6	102.4	109.3	98.3	131.3	159.3
1984	104.6	122.3	127.1	102.7	113.8	100.9	141.5	169.2
1985	104.7	122.6	126.8	102.2	118.1	101.2	143.8	174.5
1986	105.1	126.3	125.3	101.4	116.8	106.8	145.5	180.1
1987	106.7	126.6	122.2	101.7	120.0	104.2	145.1	192.3
1988	104.6	126.2	121.7	99.1	119.8	99.3	148.3	200.3
1989	98.8	123.8	119.9	97.1	119.9	97.7	149.4	205.3
1990	94.3	125.2	115.4	94.5	116.4	99.2	149.8	208.9
1991	93.9	126.2	108.8	91.7	117.1	101.2	145.2	210.2
1992	94.4	128.1	102.8	92.5	118.8	103.8	146.6	221.8

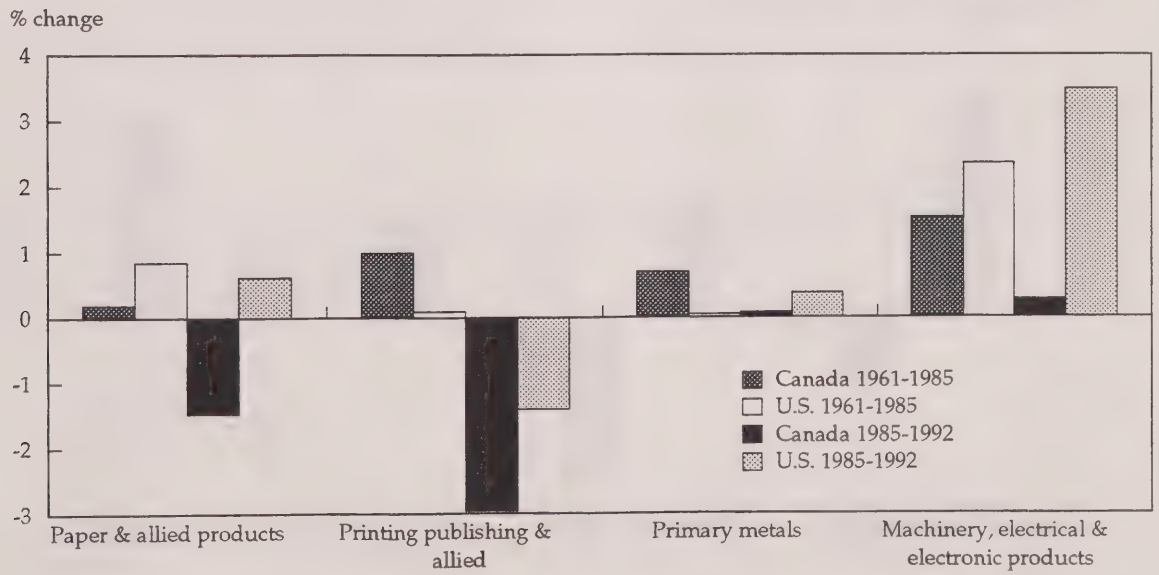
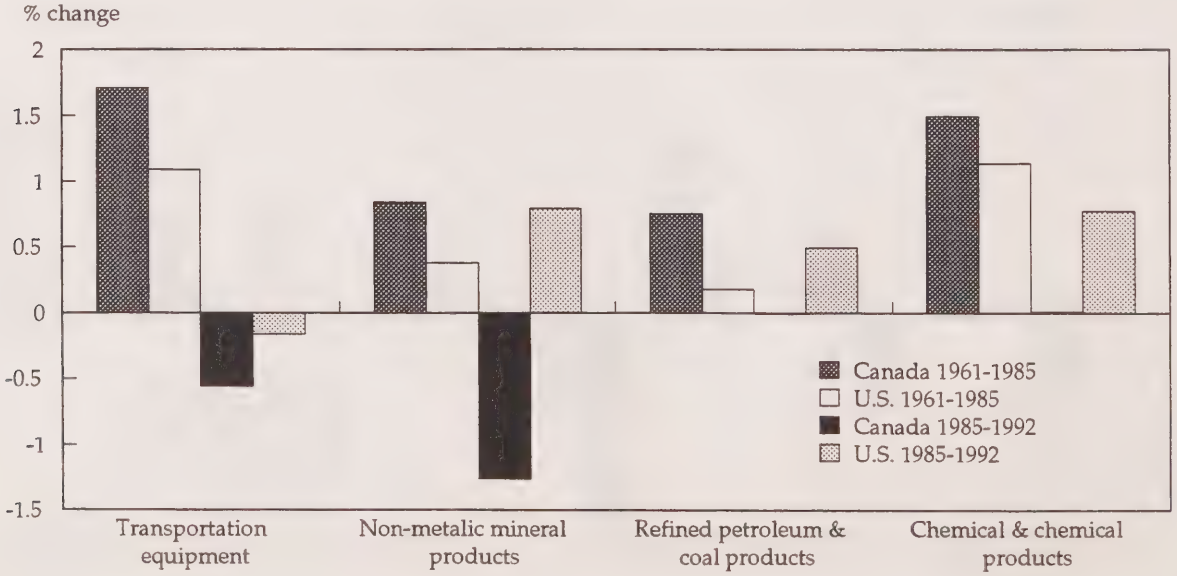


Table 7 - Multifactor productivity indices for comparable manufacturing industries in Canada and the United States, (1961=100), concluded

Year	Transportation equipment industries		Non-metallic mineral products industries		Refined petroleum & coal product ind.		Chemical & chemical products industries	
	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1962	104.5	106.2	107.5	101.2	105.4	100.5	103.6	104.1
1963	109.0	110.1	108.4	104.6	106.5	101.2	106.7	108.8
1964	110.3	112.2	112.7	106.8	108.9	102.4	111.2	112.3
1965	115.1	115.3	114.3	108.3	111.3	102.6	113.4	114.7
1966	113.1	114.4	115.7	108.1	113.2	102.7	114.5	114.7
1967	118.2	112.3	108.4	106.2	108.5	103.2	112.3	112.8
1968	121.0	115.9	113.2	108.5	110.7	104.3	113.1	120.2
1969	127.6	116.0	115.4	109.4	109.0	104.6	115.1	122.1
1970	122.7	111.0	113.8	106.2	109.4	105.9	114.1	123.9
1971	129.6	119.9	121.9	107.2	109.9	106.2	118.3	129.3
1972	133.8	120.6	131.8	110.5	109.7	107.5	121.1	136.2
1973	139.4	124.6	124.6	111.9	114.0	108.6	126.8	141.0
1974	140.8	121.9	119.4	108.3	113.4	106.6	126.4	127.0
1975	143.7	122.3	115.6	107.0	114.2	105.7	118.3	118.3
1976	145.6	127.1	117.2	108.1	113.5	106.7	124.0	124.0
1977	146.8	128.6	116.0	107.4	117.1	107.2	123.5	127.5
1978	147.2	127.8	118.1	106.7	114.5	107.5	127.4	129.1
1979	146.9	124.1	118.8	104.7	112.9	105.7	130.8	127.7
1980	138.1	117.6	111.6	102.6	113.4	105.3	126.7	119.1
1981	140.2	117.3	111.0	102.5	115.9	103.6	131.7	121.4
1982	138.7	122.0	103.6	99.7	118.7	103.1	123.7	122.9
1983	142.9	125.4	110.8	104.5	120.5	102.5	135.5	130.3
1984	148.5	129.7	116.8	107.6	121.2	104.1	140.9	131.4
1985	150.2	129.7	122.3	109.6	119.8	104.5	142.8	131.2
1986	148.4	129.8	124.4	112.2	118.6	106.6	143.7	139.3
1987	145.8	131.5	127.1	111.8	119.5	106.9	146.7	145.4
1988	148.3	130.8	126.8	111.8	119.9	107.9	149.5	144.5
1989	149.3	129.7	123.5	113.0	119.6	107.0	152.3	143.1
1990	146.6	128.1	116.4	113.2	120.1	106.2	150.1	141.6
1991	145.5	127.6	109.3	111.0	119.6	106.7	142.8	138.8
1992	144.4	128.3	111.9	115.9	119.7	108.1	142.9	138.4



APPENDIXES

1 - Basic Concepts and Methods

2 - Sources of Data

3 - Aggregation Parameters for Productivity Measures

4 - Quality Rating of Productivity Estimates and Related Data

5 - Productivity and Related Data in CANSIM

APPENDIX 1

Basic Concepts and Methods

Ideally, a productivity index is one that takes into account all paid resources that are used as inputs into the production process. A comprehensive measure, such as this, is called a **total factor**, or, alternatively, a **multifactor** productivity index. This is the focus of Part 1 of this publication. Productivity indices that take into account only a subset of the inputs such as, for instance, labour productivity indices, are called partial productivity indices. Labour productivity indices are presented in Part 2 of this publication.

The labour productivity estimates have a longer history than the rather recent multifactor productivity estimates. Consequently, they were not derived as partial indices of the multifactor productivity indices and they thus require a separate methodological description.

In particular, the labour productivity indices are based on a Laspeyres measure of real gross domestic product by industry which is not used in the multifactor productivity accounts. Hence, this appendix presents separately the basic concepts and methods used in the labour and the multifactor productivity accounts.

The concept of productivity may refer to the entire Canadian economy and/or to various components of the economy. These components, in the Canadian System of National Accounts, are either sectors or industries. The productivity indices refer only to the productivity of the resources used by the business sector of the economy. In the Canadian System of National Accounts, the business sector "encompasses that group of transactors who produce goods and services for sale at a price which is calculated to cover costs and yield a profit..."[1]. An industry is defined, in the National Accounts, "as a group of operating units [establishments] engaged in the same or similar kind(s) of economic activity, e.g., coal mines, clothing factories, department stores, laundries"[2]. Industries include both business and non business establishments but can be sectored to include only business establishments. Both the labour and the multifactor productivity indices presented in this publication refer, either explicitly or implicitly, to business establishments only.

The productivity of the government sector can not be calculated at this time in the framework of the Canadian System of National Accounts. The output of non-business sector industries is difficult to measure because it is not normally sold on the market. This means that in general, output prices are not available for this sector. The conventional measure of real output for non-business sector industries is therefore constructed by deflating the value of output with input prices. By convention (for lack of a better alternative), this amounts to measure the real output of the government sector as being equal to its primary input use. As a consequence, the growth in output cannot diverge from the growth in inputs as required for a meaningful productivity measure[3].

1 - Labour Productivity and Unit Labour Costs

1.1 - Labour Productivity

The labour productivity measure is **real GDP per hour worked**. This indicator is constructed as a ratio of real output to labour input, and is presented in index number form.

Although labour input is an important determinant in the level of output, it is not the only one.

1. Robert B. Crozier, *National Income and Expenditure Accounts, Volume 3, A Guide to the National Income and Expenditure Accounts, Definitions-Concepts-Sources-Methods* (catalogue 13-549, 1975, p. 101).

2. *The Input-Output Structure of the Canadian Economy, 1961-1981* (catalogue 15-510, p. 18).

3. Further detail on the industry coverage of the productivity measures in this publication can be found in Appendix 3.

Other inputs also contribute to the production process. Partial productivity indices that do not take these inputs explicitly into account are therefore subject to changes in these inputs as one of the component of the productivity ratio, namely the output level, is partly determined by these other inputs. Hence, a partial productivity index may rise through time either because these other inputs are used in larger quantity or because the efficiency of the production process improves or both. It follows that partial productivity indices such as the labour productivity indices are not precise indicators of overall productive efficiency.

1.2 - Output

The concept of output used in labour productivity measurement is the constant price Gross Domestic Product at factor cost by industry (excluding Government royalties on natural resources and rents of Owner-occupied dwellings). The output measures are calculated with 1961 prices for the period 1961 to 1971, with 1971 prices for the years 1971 to 1981, with 1981 prices for the years 1981 to 1986. Estimates in subsequent years are calculated with 1986 prices. These series were then rescaled to correspond to a 1986 reference year (i.e. 1986=100) for convenience, as 1986 is the base year currently in effect in the Canadian System of National Accounts. The rates of growth in the original series are not affected by the choice of reference year. A more complete description of the output measures is found in *The Input-Output Structure of the Canadian Economy 1961-1981* (Catalogue 15-510) and in *The Input-Output Structure of the Canadian Economy in Constant Prices, 1961-1981* (Catalogue 15-511).

1.3 - Labour Input

In principle, labour input should cover all labour services expended to produce a given output. This report presents one measure of labour services: the hours worked. This measure does not take into account the changing quality of labour input as is the case when measuring multifactor productivity. But the underlying estimates of persons at work and on-hours worked are the same in both set of productivity estimates. Thus, the aggregate labour inputs of different classes of labour are obtained by adding the number of hours worked across classes.

Persons at work denote all paid and other-than-paid persons engaged in the production of output. Other-than-paid workers include self-employed workers and unpaid family workers.

Hours worked are the sum of hours worked spent at the place of employment by persons at work, and therefore differ from a measure of hours worked paid by excluding vacation time, holidays, time lost due to illness, accidents, etc.

1.4 - Labour Compensation

Labour compensation is a measure of the value of labour services engaged in the production process. It includes all payments in cash or in kind by domestic producers to persons at work as remuneration for work, including wages, salaries and supplementary labour income of paid workers, plus an imputed labour income for self-employed workers. Statistics on labour compensation reported here represent the most comprehensive labour cost data available for all industries at the present time since they include both cash payments and supplements and cover all remunerated persons at work.

The estimate of the value of labour services of self-employed persons is an imputed value. The imputation is based on the assumption that the value of an hour worked by a self-employed person is the same as the value of an hour worked by an average paid worker in the same industry. This assumption is based on the premise that labour services are contracted on a temporal basis, and a measure of labour compensation should not reflect returns on investment or risk taking. An adjustment is made in the case of self-employed persons such as doctors, dentists, lawyers, accountants and engineers. In these cases, the average earnings of paid workers in the same industry tend to be lower than the earnings of the self-employed workers. Although self-employed workers are in majority in the industry, the imputation of earnings for these workers at the average rate in the industry tends to underestimate the income of the self-employed. In this case, direct evi-

dence on average labour income of these workers is introduced.

Unpaid family workers, while not directly recompensed for their services, are not a free resource, and their contribution is reflected in the net income of the firm where they are employed. However, no labour income is imputed to unpaid family workers. There is no valid basis for measuring the value of their services, and it is judged that less error is generated by their exclusion from measures of labour compensation than by imputing labour income to them at the same rate as paid workers. The number of unpaid family workers is insignificant in most industries.

1.5 - Unit Labour Cost

Unit labour cost is the ratio of labour compensation to real GDP. It is a measure of the cost of labour per unit of real output. Unit labour cost can also be viewed as the ratio of average compensation to labour productivity; thus, unit labour cost will increase when average compensation grows more rapidly than labour productivity.

1.6 - Absolute Values

All time series in this report are presented as indices taking a value of 100 in 1986. This form emphasizes relative change, as opposed to levels, as being important in the construction of productivity measures and related cost series. One can reconstruct the absolute values underlying the indices of hours worked, real gross domestic product and labour compensation. These absolute values are of some interest as they indicate the level of those series. Nevertheless, the growth rate of the series is the same whether it is calculated from the index or the absolute values.

Table 1 gives the absolute values underlying the indices for the year 1986. To calculate the absolute values corresponding to the published indices the following procedure can be followed:

$$\frac{\text{Index}}{100} \times \text{1986 value from Table 1}$$

Table 1 - Absolute values of labour productivity and unit labour cost, 1986

	Real gross domestic product	Hours worked	Labour compensation
Industry Title	$'000,000	000,000	$'000,000
Business sector industries	335,673	15,320	225,279
Business sector - excluding agricultural and related services industries	324,616	14,237	219,748
Business sector - services	173,374	9,015	126,419
Business sector - goods	162,299	6,305	98,859
Agricultural and related services industries	11,057	1,082	5,531
Manufacturing industries	86,789	3,341	56,919
Construction industries	28,082	1,242	23,449
Transportation and storage industries	20,254	897	14,758
Communication industries	13,248	353	7,645
Wholesale trade industries	23,312	1,066	17,128
Retail trade industries	28,269	2,343	23,949
Community, business and personal services industries	52,119	3,286	41,921

The measurement of employment, output, and the other series mentioned above are subject to some, usually indeterminate, margin of error. These errors usually have a larger impact on the level of the estimates than on their growth rates. While such statistical errors will also have some effect on measures of relative change, it can be expected that their effect will be more serious when comparisons of absolute levels are attempted.

2 - Multifactor productivity

2.1 - Multifactor Productivity in a Nutshell

Although the partial labour productivity indices described above are appropriate for many analytical uses, they do not describe exhaustively the sources of economic growth. This is the case because measured changes in output per unit of labour input are not necessarily attributable to the contribution of labour alone, but also to the contribution of other productive resources and to the effectiveness with which all are combined and organized for production.

On the other hand, the multifactor productivity accounts intend to measure the performance of the Canadian economy in production activities by taking the contributions of all productive resources into account. It is assumed that resources are optimally allocated between the various production activities so that the object of the performance indicators is solely to reveal the technical efficiency with which the available resources are used in each of these production activities or groups of activities.

In general, productivity gains are measured in a residual fashion as the growth in output not accounted for by the growth in production factors explicitly listed in the chosen formula. Multifactor productivity measures output per unit of all factors of production combined (such as labour, capital, materials and services used as inputs in the production of goods and services). Consequently, multifactor productivity does not reveal the contribution of the production factors but the joint effects of technical progress, economies of scale, and other factors not explicitly taken into account.

This publication presents two complementary categories of multifactor productivity indices. One category takes into account only the productivity gains made by an industry without considering the productivity gains made by its upstream suppliers. The other looks at the productivity gains made in the production of the goods and services of an industry by taking into account the productivity gains made by all industries which contributed directly and indirectly to that production. This measure basically consists in a measure of productivity by product category rather than by industry.

The first category of indices measures the growth in the gross output of an industry not accounted for by the growth in all of its factors of production; that is, both the inputs called primary, which are the labour and capital inputs, and the intermediate inputs, which are the materials and services purchased from other industries. This index does not take into account the productivity gains which take place in the industries which produce these intermediate inputs[4]. We will refer to this index as the **industry** index. Because the industry index does not account for the productivity gains realized in other industries, it can be viewed as a tool to assess productivity gains in a static partial equilibrium framework.

The second category of productivity indices takes into account the productivity gains realized in the upstream industries supplying intermediate inputs[5]. The index measures the growth in the output of an industry not accounted for by the growth in all its primary inputs as well as by the growth in the primary inputs used in the production of its intermediate inputs by its direct and indirect industry suppliers. In that

4. Except in variant of this index for intermediate inputs originating from the industry itself as will be explained below.

5. The concept and the empirical estimates were first introduced by T.K. Rymes and A. Cas in a study done for Statistics Canada between 1983 and 1985 and published later. See Cas A. and T.K. Rymes (1991), *On Concepts and Measures of Multifactor Productivity in Canada, 1961-1980*, Cambridge University Press, New York. However, contrary to Rymes and Cas, we include the capital stock in the primary inputs rather than in intermediate inputs.

perspective, the **interindustry** productivity index takes into account all the primary inputs which have been used in the business sector as a whole to produce a given bundle of goods and services. They may be seen as productivity indices attached to commodity bundles rather than to industries. These indices are called interindustry or commodity (bundles) indices.

Both measures of productivity are useful. For instance, in an effort to assess the performance of an economy as a whole in the production of some bundle of goods, it would be inappropriate to consider the declining industries with low productivity gains without also looking at the performance of the industries supplying them with goods and services. The latter industries, which may benefit from important productivity gains, may also be strongly dependent on the low performance industries for the sale of their output.

2.2 - The Concept and Measurement of Multifactor Productivity

The level of multifactor productivity is a ratio between the level of production of industries and the quantity of all inputs they use. Although there may be alternative ways to compute the productivity ratio, all of these consist in combining all the goods and services produced into a single aggregate output index and, likewise, all of the production factors used into a single aggregate input index. The aggregation of the goods and services produced or used in the production process requires that these goods and services be measured in some common units. Similarly to the weights and measures in physics, index numbers use the relative value of the goods and services at some specific point in time as the common unit of measure. They are in fact weighted averages where each good/service is attributed a weight according to its contribution to the value of the aggregate of which it is a part of. Thus, the greater the nominal value of the good/service, the larger share it will have in the aggregate[6]. The multifactor productivity index level is computed as the ratio of the aggregate output index to the aggregate input index. Productivity growth is positive if the aggregate output index grows faster than the aggregate input index. Productivity decreases in the opposite case.

For empirical applications, some choices have to be made on how to actually measure inputs and outputs. The most widespread choice at the industry level is the **gross output** measure. The gross output of an industry is the aggregate volume of all goods and services produced and work done by the industry.

Gross output can be defined as either including or excluding intra-industry sales. When all intra-industry sales are removed, productivity growth is computed as if all establishments of the industry were integrated together into a single large establishment covering the whole industry. That establishment sells all its output outside the industry and buys all its inputs from without the industry. For that reason, these indices are called the **intra-industry integrated** productivity indices.

Correspondingly, on the input side, the measure of the index has to be inclusive of all used (and measurable) inputs which can be classified into two broad categories: (1) intermediate inputs which are comprised of the many goods (raw materials) and services purchased by the establishments of the industries, and (2) primary inputs including labour inputs, capital inputs, and natural resources. Intra-industry purchases are excluded in the intra-industry integrated indices.

More precisely, intermediate inputs are considered to be those inputs which are produced and are consumed during the same period (usually a year) by the business sector. The primary inputs are supplied from other sectors of the economy such as the household sector. Capital goods are commodities produced by the business sector like intermediate inputs. However, they are accumulated only if savings occur. Capital goods are supplied to the business sector at the beginning of each period by the households

6. This can be established more formally as the Divisia aggregation formula for a twice differentiable linearly homogeneous production function under competitive market conditions and profit maximization. The time continuous Divisia index is approximated by the chained Törnqvist index.

which are the asset holders of the economy. In addition, they are excluded from the intermediate input set on the ground that they are, by definition, not totally consumed during the period in which they have been produced. Households also supply labour inputs.

As discussed further below, imported inputs and a few other variables can also be included in the set of primary inputs or else be considered as intermediate inputs depending on which result one wants to obtain. Indeed, imported inputs are not produced by the business sector and, from that standpoint, could be considered as primary inputs. On the other hand, imports are produced inputs and therefore, although they are non domestic inputs, can be considered as intermediate inputs.

In the estimation of the multifactor productivity indices, a more detailed breakdown of both the inputs and outputs by commodity were used as described in Appendix 3. The more disaggregated (and consequently more homogeneous) set of commodities used improves the quality of the measured productivity indices and presents a definite advantage over the more aggregated (and more heterogeneous) set of commodities usually used by other investigators. However, due to statistical limitations, natural resources are not presently included in the input set. It is hoped that natural resources will be included in the future as estimates of their prices and uses become available. It is believed that this data shortage has implications mostly for the quality of estimates of resources industries but that it has little impact on the estimates of other industries.

The multifactor productivity indices have an important advantage over the partial labour productivity indices. This advantage stems from the inclusion of all the major factors contributing to the growth of output in the economy. Output growth is thus accounted for by increases in productive capacity, by a greater use of various services and goods purchased by industries (including energy) and by the growth in labour input. As mentioned above, output growth which is not accounted for by the growth of inputs is called productivity. Therefore, the more detailed and inclusive is the list of production factors entering into the estimates, the more the growth in output can be "explained".

The inclusion of all production factors in the computation of productivity indices does not preclude the computation of meaningful indices of partial productivity. However, in order to analyse and to explain the partial productivity of any contributing production factor, one must first express its productivity in relation to the contribution of the other production factors. For instance, the index of partial labour productivity may have increased because the quantity of equipment, raw materials, and energy used per unit of labour have increased. Only when the contribution of these other factors have been netted out can the partial labour productivity be meaningfully related to factors such as education and experience.

Multifactor productivity presents a net advantage on this count compared to labour productivity, precisely because it allows the decomposition of increased labour productivity between the portion which comes from the contribution of the other production factors, and the portion which comes from factors explaining the increased efficiency of labour, such as education. The labour productivity indices presented in this publication do not allow such a decomposition.

The interindustry and the aggregate multifactor productivity indices take into account the productivity gains made in the production of the intermediate inputs while the industry indices based on gross output do not take these gains into account. Productivity indices based on gross output net of intra-industry sales take into account the productivity gains made by industries in the production of own used inputs but do not take into account productivity gains made in upstream industries.

Finally, all productivity indices consider capital goods as primary inputs, that is as non-produced inputs. Capital goods are nevertheless inputs that are produced by capital goods industries. Productivity gains made in the production of capital goods are not presently taken into account by any of the indices produced. The bias involved may be important. Indeed, if the econ-

omy was growing along a steady state growth path (along which the capital/output ratio would be fixed), its multifactor productivity gains would be equal to the partial labour productivity gains, were we to take into account the productivity gains made in the production of capital goods. We hope to be able to estimate these productivity gains in the future.

2.3 - Which Resources and How are they Measured?

Unemployed resources are excluded from the computation of productivity. Thus, for example, the labour input is measured with hours worked rather than with the available labour force. The productivity indices, consequently, do not measure the performance of the economy as a whole which is often reduced by the non-utilization of available resources. Rather, the productivity indices presented here intend to track the evolution of the technical performance of the production processes which would obviously not be well captured if unemployed resources were taken into account.

On the other hand, resources engaged in the production process may not be fully employed as is often the case in economic downturns. Labour hoarding is a classical example: in response to decreasing demand for its product, an establishment may not lay off its employees for various reasons such as separation costs and the cost of training new employees when operations expand later on.

An adjustment is made to take into account the capacity utilization rate of capital by calculating the cost of capital, that is, its share in the index of combined inputs, in a residual manner rather than by calculating it using the user-cost-of-capital approach (interest rates, depreciation rates, and other variables affecting the price of capital services)[7].

However, this correction does not fully eliminate the cyclical fluctuations of the indices and, consequently, does not reveal the trend followed by technical progress. This may be due to the fact that capital is not the only quasi-fixed factor. We just mentioned above the phenomena of labour hoarding. Short run disequilibrium may also act on the measure as well as scale economies and errors in the data.

However, over the long run, that is from peak to peak in economic activity, the indices do in fact reveal the increased productivity associated with technological possibilities, either in the form of technical progress or through a better use of all available technologies.

2.4 - Aggregate multifactor productivity

The discussion of the various concepts has hitherto been made with reference to the industry or commodity group as the main subject. What about multifactor productivity measures for the total business sector? What impact has the aggregation level on the definition of output and inputs? The answers to these questions are the main focus of this section.

If we wish to measure the productivity of the business sector as an integrated entity, only the production of goods and services sold outside the sector should be taken into account. Correspondingly, only the inputs coming from outside the sector should be accounted for. The **industry** productivity measure based on gross output then becomes inappropriate. The sum of the gross outputs of all industries in the business sector corresponds to much more than the outbound production as it includes all goods and services bought by other industries and used as intermediate inputs in the production of other goods and services.

Let us consider the alternative intra-industry integrated output model, where intra-industry sales are netted out from both output and inputs. At the total business sector level all intermediate inputs, with the exception of imported inputs and inputs originating from other sectors of the economy, are intra-industry sales. The productivity index based on this model thus leaves, as output, the production of goods and services delivered to final demand and, as inputs, the resources available to the business

7. See Berndt, E.R. and Fuss, M.A., "Productivity Measurement with adjustments for variations in capacity utilization and other forms of temporary equilibrium", *Journal of Econometrics* 33 (1986) 7-29, North-Holland.

sector, that is its primary inputs of capital and labour and imported inputs and inputs supplied by other sectors of the economy.

This model considers the business sector as an entity whose establishments are integrated together but isolated from the rest of the economy and the rest of the world. The associated productivity measure does not take into account the productivity gains made in the production of imported inputs and inputs originating from other sectors. These inputs are considered as primary. It thus consists of a productivity measure which does not account for all productivity gains made in the economy.

By contrast, for the integrated world economy, goods and services exchanged between countries are intermediate inputs. In that perspective, productivity gains made in their production must be accounted for and these gains must be attributed to the respective producing economies. These inputs must be excluded from the primary input set of industries and their contribution to final sales (accounted for in their respective country's exports) netted out to retain only the capital and labour inputs and, as a counterpart, the value added of the business sector. The business sector is thereby seen as integrated to the world economy. We obtain in that fashion the most extensive measure of productivity of the business sector. This is the **value-added** productivity index.

2.5 - Usefulness of Productivity Indices in Economic Analysis

As indicated above, the main purpose of the multifactor productivity measures is to separate the observed growth in industrial production into increases in the economic resources employed by industries and increases in overall efficiency. This step allows a more complete accounting of the sources of economic growth than the partial measures presented in the framework of the Canadian System of National Accounts. Time series of multifactor productivity by industry also allow analysts to measure trends and detect shifts in competitive advantages among various Canadian industries vis-a-vis similar industries in the rest of the global economy. By showing how industries' evolution has been influenced by their technical performance, the assessment of multifactor productivity helps analysts and policy makers to address such issues as domestic industrial policy and international industrial strategy. Similarly, businesses and other private organizations observe productivity movements to evaluate the long-term viability of various industries and make more informed investment decisions.

In addition, proper growth accounting opens the way to a better understanding of the sources of productivity growth. The latter can be conceptually decomposed into three components: economies of scales, technical progress and measurement errors due to omitted factors. Growth accounting paves the way to further analysis of the sources of economies of scale and technical progress. Taking technical progress as an example, it could be defined as the general advance in knowledge. If we accept this definition, then, over the long run, technical progress is the only source of permanent and sustained improvement in productivity. Indeed, at any point in time, the level of education of workers may be raised only to a certain limit through investments in education. Similarly, the diffusion of the best known technologies through investments in physical equipment has a limit as well as the best use of existing technical possibilities through economies of scale. Only investments in fundamental research in both human and natural sciences and investments in applied research and development can lead to a better and more educated labour force and better equipment over the very long run. Measuring the contribution of technical progress to the growth in output helps in understanding the importance of society's investment in such research.

APPENDIX 2

Sources of Data

This Appendix includes a description of data sources employed in the production of labour and multifactor productivity indices. As indicated in Appendix 1, labour productivity indices are not produced as partial multifactor productivity indices. Because both these index types are derived in part from different data sources, we describe their sources separately. More specifically, labour productivity indices are based on Laspeyres indices of Gross Domestic Product while multifactor productivity indices are calculated mainly from Törnqvist indices of gross and net-gross output. In spite of these differences, the measure of labour hours are identical in both productivity measures.

The description of data sources is divided in two categories depending on whether data are preliminary or final. Final data are based on benchmarked data from the Input-Output Accounts as well as on statistics obtained from censuses and surveys, while preliminary data are based on other more up to date but less reliable data.

1 - Description of Labour Productivity Data

1.1 - Output

The output data used to calculate the indices of labour productivity and unit labour cost are the estimates of constant price Gross Domestic Product at factor cost by industry. The following sources are utilized: *The Input-Output Structure of the Canadian Economy in Constant Prices* (Catalogue 15-202) and *Gross Domestic Product by Industry* (Catalogue 15-001) for the years following the benchmark year. The data on real GDP in the Finance, Insurance and Real Estate Industries excludes real GDP of government royalties on natural resources and rents of owner occupied dwellings.

1.2 - Labour Input

The indices of productivity employ the number of hours worked. Hours worked are computed from the number of persons at work and the average annual hours worked. The description of sources for the employment and hours estimates applicable to the last four years are presented below[1].

1.2.1 - Estimations of Persons at work

Persons at work. Persons at work are made up of two groups: paid workers and other-than-paid workers. The other-than-paid workers include self-employed and unpaid family workers. Up to the year of the preliminary input-output tables, the paid workers and other-than-paid workers estimates are produced at the most detailed level of the System of National Accounts. This represents employment estimates for 216 different industries, including the non-commercial sector.

Beginning in 1988, an important change has been made to the estimates of persons at work used in measures of productivity. The number of persons at work obtained as the average of the aggregation of the estimates of all industries obtained from different sources is reconciled to the employment obtained by applying the growth rate of total employment obtained from the Labour Force Survey to the 1987 employment level. The growth rate of commercial and non-commercial employment obtained from this survey also serves as annual benchmark. Any difference between the estimates is allocated between the trade industries and the Community, Business and Personal Services (excluding education and hospital industries) because employment data for these industries are con-

1. For further details about labour input data sources, the reader is referred to *Indexes of Output Per Person Employed and Per Man-hour in Canada, Commercial Non-agricultural Industries, 1947-1963* (Catalogue 14-501) for the years 1946 to 1961 and to: Karnail S. Gill and Monique Larose, *Sources and Methods of Estimating Employment by Input-Output Industries 1961-1989*, Input-Output Division, Technical Series, #47, 1991.

sidered less reliable. The same method is applied to the preliminary data described below.

Benchmark data

Paid workers. The number of paid workers including multiple job holders in agriculture, fishing and trapping industries as well as for wholesale trade, and the accommodation and food industries is taken from the *Labour Force Survey* (Catalogue 71-001).

The mining, quarrying and oil well industries are broken down into four major groups according to the 1980 SIC:

1. Mining industries;
2. Crude petroleum and natural gas industries;
3. Quarry and sand pit industries;
4. Service related to mineral extraction.

The primary data source used for the first three groups is the *General Review of the Mineral Industries*, (Catalogue 26-201). The only exception is the oil sands industry, which falls into the second major group, crude petroleum and natural gas industries. This industry is not covered in the *General Review of the Mineral Industries*, and therefore the data used for this industry are taken from the Survey of Employment Payroll and Hours. The last major group, service industries incidental to mineral extraction, *Employment, Earnings and Hours*, Catalogue 72-002 has been used.

The source of the number of paid workers in manufacturing is *Manufacturing Industries of Canada: National and Provincial Areas* (Catalogue 31-203) a publication from the annual survey of manufactures.

The publication *Employment, Payroll and Hours* (Catalogue 72-002) is the source for the following industries:

Logging and forestry industries;
Construction industries (contract work);
Transportation and storage industries;
Other utility industries;
Finance, insurance and real estate industries;
Business service Industries;
Educational service industries;
Health and social services industries;
Personal and other service industries;
Non-commercial services.

In transportation and storage industries the following publications were used to derive the number of paid workers: *Air Carrier Operations in Canada* (Catalogue 51-002), *Rail Transport* (Catalogue 52-212; 52-215 and 52-216), *Gas Utilities: transportation and distribution systems* (Catalogue 57-205) and *Oil Pipeline Transport* (Catalogue 55-201), *Passenger Bus and Urban Transit Statistics* (Catalogue 53-215).

In the case of the four communication industries, paid workers data were obtained from: *Radio and Television Broadcasting* (Catalogue 56-204); *Cable Television* (Catalogue 56-205), and *Canada Post Corporation Annual.*

Among the industries in the above list, the construction industry requires a clarification. The Input-Output concept of the construction industry includes the construction activity contracted out as well as the activity carried out by the work force of all other industries. The latter activity is named Own-Account Construction. Given a lack of data on the employment directly affected to own-account construction, such employment is estimated from data on labour remuneration cost obtained from *Construction in Canada*, (Catalogue 64-201). The volume of labour employed in this activity is obtained as the ratio between own-account construction labour compensation and the average wage in the industry where the activity takes place. These volume is subsequently transferred to the business sector construction industry. In the 1980s, own-account construction activity represented about 25% of total construction activity.

Other-Than-Paid workers. The main data source for other-than-paid workers is the Labour Force Survey. However, the number of self-employed workers, medical doctors and dentists that belong to the Health and Social Services Industries (except hospitals) are obtained from *Fiscal Statistics*, Revenue Canada Taxation, (Catalogue RV 44).

Preliminary data for the recent years

Preliminary data for the two most recent years are produced only at the "S" level of aggregation of the Input-Output tables. For the paid workers, the year-to-year change from Labour Force Survey (LFS) and Survey of Employment Payroll and Hours (SEPH) was applied to the absolutes values of the last benchmark year. For other-than-paid workers, the data were obtained entirely from the Labour Force Survey.

1.2.2 - Estimation of hours worked

Hours worked. The number of hours worked for each industry is obtained by the product between the number of persons at work and the average number of hours worked per person per year. Given the availability of employment data, the estimation of hour worked consist of estimating the average hours worked per year.

Benchmark data[2]

The estimation of average hours worked per year up to the benchmark year is made at the "PL" aggregation level, i.e., for 122 industries. With the exception of the mining and manufacturing industries, all data on average hours worked are from the Labour Force Survey.

Monthly data from the Labour Force Survey refer only to the survey week, usually the week falling on the 15th day of the month. Respondents having worked during the reference week are asked a series of questions on hours worked. The questions concern regular hours, overtime hours, hours effectively worked as well as hours lost and the reason for work absence. This information allows a verification of each element of the response on hours and permits the estimation of total annual hours worked. Given that the statistics refer to a precise week of the month, annual data represent only the observation of hours corresponding to 12 survey weeks during the year. To estimate the effective hours worked during the all weeks of the year, a methodology was developed in the Productivity Measurement Section[3]. The goal of the methodology is to adjust the hours effectively worked reported by the survey in relation to two factors. One is the effect of holidays falling in the reference week, the other being the effect of time lost due to labour conflicts[4].

The method used to estimate annual hours worked from data originating in the Labour Force Survey has four main stages:

1 - The first consists of adding estimates of hours lost due to holidays or labour conflict to the estimates of hours worked during the reference week. The result is an estimate of the hours than would have been worked in the absence of conflicts and holidays. These monthly data are then interpolated in order to obtain the estimates for the 52 weeks of the year.

2 - The second stage is to adjust the estimates of hours worked by the hours lost due to holidays. This information is obtained directly from the Labour Force Survey in the case of holidays during the survey week. Those not in the survey week are estimated. This is done by identifying and classifying the main Canadian holidays in three categories 1) Most important (Christmas, New Year, Easter Monday, Canada Day, Labour Day, Thanksgiving), b) Important (Victoria Day, Boxing Day), and 3) less important (Easter Monday, St. Jean Baptiste/Civic Holiday, Remembrance Day)[5]. The classification reflects the fact that most employees have the right to

2. For further details on hours worked data sources used to measure productivity indices for the years 1961 to 1988, see the feature article entitled "Hours Worked: A New Measure of Labour Input for Multifactor Productivity" by Jean-Pierre Maynard, *Aggregate Productivity Measures 1991*, Catalogue no. 15-204E.

3. For a complete description of this methodology, see Maryanne Webber, *Estimating Total Annual Hours Worked from the Canadian Labour Force Survey*, Input-Output Division, Technical Series, #51, Statistics Canada, April 1983.

4. The employment concept of the Labour Force Survey includes as employees, any respondents that did not work during survey week due to labour disputes.

5. The classification of statutory holidays in order of importance comes from data collected by the Pay Research Bureau, a service of the Public Service Staff Relations Board of the Federal Public Service.

the important holidays and that a smaller proportion have the right to other holidays. The number of hours lost for the three holiday types is estimated based on those of holidays corresponding to the same category falling during the survey week.

3 - The third stage consists of removing hours lost due to labour conflict[6]. It must be noted that only the statistics on paid workers are adjusted for this type of absence.

4 - Finally, the average annual weekly hours worked is obtained by the average weekly hours after adjustment for labour stoppage and holidays. The average number of hours worked per year is obtained as the product of the weekly average by the number of weeks in the year. This last component is not constant but follows the vagaries of the calendar. A calendar year comprises 52 full weeks plus one day (two in leap years); if any of these days fall on a non-working day, the year has exactly 52 weeks, and exceeding this in all other cases. As a result, the number of hours worked may change from year to year due to fluctuations in the length of the year.

This method permits the estimation of average hours worked for paid workers with the exception of the mining and manufacturing industries and for the other-than-paid category for all industries, except manufacturing industries.

Data for the manufacturing industries are obtained from the annual Survey of Manufactures as well as from other surveys. The calculation of hour worked by production workers is different from that of salaried workers. The number of hours worked by production workers is obtained directly from the annual Survey of Manufactures. In the case of salaried workers, the survey only collects information on normal work hours and number of vacation days. The average hours worked by this last group are obtained by deducting from normal hours the number of hours not worked due to vacations and holidays. In the case of self-employed workers it is assumed that they work the same average hours as the paid workers in the same industry.

Hours worked data for each of the four mining industries are subject to a special methodology. The estimates for metal mines, non-metal mines and sand and quarrying and sand pits are estimated on the basis of data on hours worked by production workers derived from the Census of Mines to which we add the average hours paid of salaried employees from the Survey on Employment, Payroll and Hours. The latter are adjusted by means of data on average hours of paid absence calculated as the difference between hours paid and hours worked by production workers. Average hours for the oil and gas industry are obtained directly from the Labour Force Survey. Average hours in mining services are obtained from data on hours paid in the Survey of employment, Payroll and Hours to which an adjustment is made for time lost. To reflect the total paid workers for this industry, the total hours worked of the Labour Force Survey at aggregation level "S" (excluding oil and gas) is used as benchmark and allocated proportional to the share of each component estimated from the different sources described above.

Preliminary data

In the case of recent years for which no Survey of Manufactures or Census of Mines data are available, we project benchmark data by the growth rate of hours worked of the Labour Force Survey.

1.3 - Labour Compensation

There are two components to **labour compensation**: labour income of paid workers and an imputed labour income of self-employed workers. The labour income of paid workers is taken from *The Input-Output Structure of the Canadian Economy* (Catalogue 15-201), up to and including the year of preliminary tables. Data for the two most recent years are taken from *Estimates of Labour Income* (Catalogue 72-005) after adjustments are made to reroute own-account con-

6. For more information concerning this survey, refer to *Collective Bargaining Review*, Labour Canada, monthly.

struction to construction industries of the business sector.

Labour income of other-than-paid workers. In addition to the labour income of paid workers, labour compensation includes an imputed labour income for all other-than-paid workers except unpaid family workers. The imputation is based on the assumption that the hourly income for the labour of self-employed persons is the same as that of paid worker in the same year and the same industry.

An adjustment is made in the case of some professional persons, such as doctors, dentists, lawyers, accountants and engineers. These occupations are largely self-employed, but the average earnings of paid workers in the same industry division underestimates the earnings of these occupations. In these cases their average labour income are obtained from *Taxation Statistics*, Revenue Canada Taxation, (Catalogue RV 44).

2 - Description of Multifactor Productivity Data

2.1 - Introduction

Prices and volumes for inputs and outputs used in multifactor productivity indices are based on estimates from several sources. For outputs and intermediate inputs by industry, the data are obtained from the current and constant price Canadian input-output tables[7]. Some transformation of these data are required to obtain better conceptual measures for the purpose of estimating multifactor productivity. These transformations are summarized in this appendix. Primary input cost are also taken from input-output tables while their volumes are estimated from other sources. Labour input data are taken from the labour productivity program. Capital input data are described in a technical note which is summarized below[8]. The industry coverage of the business sector used for multifactor productivity estimates differ slightly from the usual definition of the national accounts as explained in more detailed in Appendix 3.

2.2 - Input-Output Commodity Data

The input-output tables are estimated at both producers' and purchasers' prices. Producers' prices are the prices received by the sellers at the boundary of their establishments. Purchasers' prices correspond to the market prices at the point of delivery and include various margins which are not taken into account in the producers' prices. Some of these margins are paid to business sector enterprises in exchange for real services such as retail and wholesale services and transportation services. Commodity indirect tax margins, on the other hand, represent a pure transfer without any real counterpart.

As the proposed productivity measures are derived under the assumption of competitive market behaviour, it can be argued that outputs of industries should be valued at producers' prices while the inputs should be valued at purchasers' prices. The Törnqvist index of productivity growth, which is used here, rests on the assumption of profit maximizing behaviour of firms in competitive markets. This implies that the marginal product of each input be equated to its real price defined as the purchasing cost on the input including all margins divided by the net selling price of the output, excluding all margins. But as real margins represent real inputs which can be substituted for other inputs over the long run, they were considered as distinct inputs rather than included in the physical volumes of the other inputs. Tax margins were included in the input set.

Conceptually, operating subsidies can be considered as negative indirect taxes. therefore, They were distributed over the input and output commodities to which they apply. Some subsidies, however, could not be attributed to specific commodities and were treated as non-commodity indirect taxes (see below).

7. For informations on data sources and concepts, refer to the *Input-Output Structures of the Canadian Economy, 1961-1981*, (Revised Data), Statistics Canada, Catalogue no. 15-510, Input-Output Division, 1987, pp. 1-127.

8. For a detailed documentation on capital input, see M. Salem et al. *Documentation of Capital Input and Capital Cost Time Series for Multifactor Productivity Measures*, Statistics Canada, Input-Output Division, September 1993.

Royalties were considered taxes levied on industries' outputs in the productivity accounts. They were subtracted from the producers' prices of outputs to estimate the net price received by producers. Royalties are considers as a rental income on natural resources received by the business sector industry Government Royalties on Natural Resources in the input-output tables. However, this is an improperly defined industry for productivity analysis as it has no inputs except for the Other Operating Surplus which is equated to the royalties received. The industry was also excluded on the grounds that it appeared doubtful that government act as a real monopoly on natural resources industries. Royalties will be introduced as part of the rental income of natural resources when estimates of the quantities of these resources become available.

Input and output volumes for goods and services were taken from producer price input-output tables without any adjustment. The reason is that in constant prices, commodity indirect taxes represent a fixed proportion of inputs calculated for the base year such that their inclusion does not affect the growth rate of volumes.

Dummy industries have been removed from the input-output tables. Corresponding dummy commodity inputs have been transformed into real inputs on the basis of the input structure of dummy industries.

2.3 - Labour Input at Current and Constant Prices

The employment and hours estimates agree with those used in the estimates of labour productivity. Sources were described in the first part of this appendix.

Labour compensation data are also identical to those used in labour productivity. However, it is important to mention that the imputation of self-employed income is deducted from the net revenue of individual businesses in the industry in order to maintain the accounting balance of the system. In addition, multifactor productivity labour input is weighted by the share of wages while labour productivity labour input is not weighted. Labour productivity labour input will be weighted once the labour productivity estimates will be obtained from the multifactor productivity estimates. This will recognize the heterogeneity of labour categories.

2.4 - Capital Input at Current and Constant Prices

The input of capital services for a given year is assumed to be proportional to the capital stock in constant prices at the end of the previous year, net of depreciation. Capital stock excludes investments made during the current year because, in general, they are not productive at this stage. Depreciation follows a geometric curve[9].

One particular problem occurs when using the net capital stock figures from the Investment and Capital Stock Division: these data are estimated for industries including all establishments, not only business sector ones as is the case of the input-output tables. Non-business industry capital stock was estimated and removed from the industries were significant differences were known to exist, namely, in non-metal mines, chemicals and chemical products, and other utility industries.

Contrary to the estimates of intermediate and labour inputs, capital input cost is estimated residually. It corresponds to the sum of other operating surplus (that is a residual item in the input-output tables), the net revenue of unincorporated businesses less the labour income of self-employed workers. Indirect taxes other than those on goods and services are added to the cost of capital (subsidies are deducted), because these taxes apply generally to property and the use of capital by the industry. The capital service price is calculated as the ratio between capital cost and the stock of capital of the previous year in constant prices.

9. In Canada - U.S. comparisons, one must note that, in the Canadian measure of the capital stock, a more accelerated depreciation pattern is being used. For a more technical description of the new capital asset series, see *Fixed Capital Flows and Stocks, Methodology*, Investment and Capital Stock Division, Statistics Canada, May 1990.

APPENDIX 3

Aggregation Parameters for Productivity Measures

The statistics presented in this publication refer to business sector industries, as defined in the Canadian System of National Accounts. There are no corresponding statistics for non-business sector industries due to difficulties in the measurement of real output in this sector, as explained in Appendix 1.

The most detailed account of the business sector is defined in terms of individual industries from the *Standard Industrial Classification* (SIC). Aggregation of SIC industries generates 154 link (L) level industries (excluding the fictive industries), 47 medium (M) level industries and 13 small (S) level industries. The industrial coverage of the business sector departs slightly from the current definition of the Canadian System of National Accounts as some components were excluded. Government Royalties on Natural Resources (industry L 140), and Owner Occupied Dwellings (industry L 141) were considered to be improperly defined industries for productivity analysis.

Granted the previously mentioned exceptions, labour productivity is evaluated at the link level industries but reported at the medium and small level industries. More detailed statistics are available on request, but subject to confidentiality criterias. For the purpose of deriving multifactor productivity growth rates, the inputs in goods and services were taken from the input-output tables at their most disaggregated level[1] (about 600 commodities). However, it was not possible to use the inputs or outputs by industry at their link level because capital stock series were not available at that level of detail. Input-output tables have been aggregated to a special level of aggregation -- identified as PL – for the multifactor productivity measures which consists of 122 business sector industries. Moreover, two more link level industries had to be dropped for lack of data on capital stock needed for the calculation of multifactor productivity growth. These industries are Laundries and cleaners (industry L 151) and Other personal services (industry L 152).

There are a total of 33 statistical tables on labour productivity appearing in Part 2 of this publication. Tables 1 to 4 are produced for special aggregates of business sector industries. Tables 5 to 12 correspond to selected S level business sector industries. The remaining tables, 13 to 33, are associated with the M level of the manufacturing industries.

Table 1 below shows the concordance between link level, medium level and small level industries of the Canadian System of National Accounts with the *Standard Industrial Classification* of 1980 and with the special aggregation (PL) used for the multifactor productivity estimates. Table 2 indicates PL level industries for which we have incomplete data. For these industries, we have assumed that the rate of growth of the available data reflects also the growth of the uncovered subset; the bias introduced this way is probably minor. Table 3 presents special aggregations used in section 2 of this publication.

1. It was impossible, at this stage, to include a measure of natural resources such as land used as inputs. Natural resources are believed to be important mostly for primary industries but to play only a minor role in other industries.

Table 1 - Concordance between link codes (L), standard industrial classification codes (SIC) special PL codes, medium level (M) and small level (S) industry codes

L Level Industries Link Code	Industry Title	1980 SIC	Code PL	Code M	Code S
1	Agricultural & related services industries	011-023	1	1	1
2	Fishing & trapping industries	031-033	2	2	2
3	Logging & forestry industries	0411,0412,0511	3	3	3
4	Gold mines	0611	4	4	4
5	Other metal mines	0612-0616,0619	6	4	4
6	Iron mines	0617	5	4	4
7	Asbestos mines	0621	7	4	4
8	Non- metal mines ex. coal & asbestos	0622-0624, 0629	10	4	4
9	Salt mines	0625	8	4	4
10	Coal mines	063	9	4	4
11	Crude petroleum & natural gas	071	11	5	4
12	Quarry and sand pit industries	081,082	12	6	4
13	Service related to mineral extract	091,092	13	7	4
14	Meat and meat products (excl. poultry)	1011	14	8	5
15	Poultry products industry	1012	14	8	5
16	Fish products industry	102	15	8	5
17	Fruit and vegetable industries	103	16	8	5
18	Dairy products industries	104	17	8	5
19	Feed industry	1053	20	8	5
20	Vegetable oil mills (exc. corn oil)	106	18	8	5
21	Biscuit industries	1071	19	8	5
22	Bread & other bakery products industry	1072	19	8	5
23	Cane and beet sugar industry	1081	20	8	5
24	Misc. food products industries	1051,1052, 1082,1083,109	20	8	5
25	Soft drink industry	111	21	9	5
26	Distillery products industry	112	22	9	5
27	Brewery products industry	113	23	9	5
28	Wine industry	114	24	9	5
29	Tobacco products industries	121,122	25	10	5
30	Rubber products industries	151-159	26	11	5
31	Plastic products industries	161-169	27	12	5
32	Leather tanneries	1711	28	13	5
33	Footwear industry	1712	28	13	5
34	Misc. leather and allied prod., ind.	1713,1719	28	13	5
35	Man-made fibre yarn & woven cloth	181,1829	29	14	5
36	Wool yarn & woven cloth industry	1821	29	14	5
37	Broad knitted fabric industry	183	30	14	5
38	Misc. textile products industries	191,193,1991, 1993-1995,1999	31	14	5
39	Contract textile dyeing and finishing	1992	31	14	5
40	Carpet, mat & rug industry	192	32	14	5

Table 1 - Concordance between link codes (L), standard industrial classification codes (SIC) special PL codes, medium level (M) and small level (S) industry codes - continued

L Level Industries

Link Code	Industry Title	1980 SIC	Code PL	Code M	Code S
41	Clothing industries exc. hosiery	243-245, 2491-2493, 2495-2499	33	15	5
42	Hosiery industry	2494	33	15	5
43	Sawmills, planing & shingle mills	251	34	16	5
44	Veneer and plywood industries	252	35	16	5
45	Sash, door & other millwork ind.	254	36	16	5
46	Wooden box & coffin industries	256,258	37	16	5
47	Other wood industries	259	38	16	5
48	Household furniture industries	261	39	17	5
49	Office furniture industries	264	40	17	5
50	Other furniture and fixture industries	269	41	17	5
51	Pulp & paper industries	271	42	18	5
52	Asphalt roofing industry	272	43	18	5
53	Paper box & bag industries	273	44	18	5
54	Other converted paper products ind.	279	45	18	5
55	Printing & publishing industries	281,283,284	46	19	5
56	Platemaking, typesetting & bindery	282	47	19	5
57	Primary steel industries	291	48	20	5
58	Steel pipe & tube industry	292	49	20	5
59	Iron foundries	294	50	20	5
60	Non-ferrous smelting & refining ind.	295	51	20	5
61	Aluminum rolling casting, extruding	296	52	20	5
62	Copper rolling casting & extruding	297	53	20	5
63	Other metal rolling, casting etc.	299	54	20	5
64	Power boiler & struct. metal ind.	301,302	55	21	5
65	Ornamental & arch. metal prod. ind.	303	56	21	5
66	Stamped, pressed & coated metals	304	57	21	5
67	Wire and wire products industries	305	58	21	5
68	Hardware, tool & cutlery industries	306	59	21	5
69	Heating equipment industry	307	58	21	5
70	Machine shops industry	308	61	21	5
71	Other metal fabricating industries	309	62	21	5
72	Agriculture implement industry	311	63	22	5
73	Commercial refrigeration equipment	312	64	22	5
74	Other machinery & equipment ind.	319	65	22	5
75	Aircraft & aircraft parts industry	321	66	23	5
76	Motor vehicle industry	323	67	23	5
77	Truck, bus body & trailer industry	324	68	23	5
78	Motor vehicle parts & accessories	325	69	23	5
79	Railroad rolling stock industry	326	70	23	5
80	Shipbuilding and repair industry	327	71	23	5

Table 1 - Concordance between link codes (L), standard industrial classification codes (SIC) special PL codes, medium level (M) and small level (S) industry codes - continued

L Level Industries					
Link Code	Industry Title	1980 SIC	Code PL	Code M	Code S
81	Misc. transportation equipment ind.	328,329	72	23	5
82	Small electrical appliance industry	331	73	24	5
83	Major appliances (elec. & non-elec.)	332	74	24	5
84	Record players, radio & tv receiver	334	75	24	5
85	Electronic equipment industries	335	76	24	5
86	Office, store & business machines	336	77	24	5
87	Communications, energy wire & cable	338	78	24	5
88	Battery industry	3391	79	24	5
89	Other elect. & electronic products	333,337 3392-3399	79	24	5
90	Clay products industry	351	80	25	5
91	Cement industry	352	81	25	5
92	Concrete products industry	354	82	25	5
93	Ready-mix concrete industry	355	83	25	5
94	Glass & glass products industries	356	84	25	5
95	Non-metallic mineral products n.e.c.	357-359	85	25	5
96	Refined petroleum & coals products	361,369	86	26	5
97	Industrial chemicals industries n.e.c.	371	87	27	5
98	Plastic & synthetic resin industry	373	88	27	5
99	Pharmaceutical & medicine industry	374	89	27	5
100	Paint & varnish industry	375	90	27	5
101	Soap & cleaning compounds industry	376	91	27	5
102	Toilet preparations industry	377	92	27	5
103	Chemical & chemical products n.e.c.	372,379	93	27	5
104	Jewellery & precious metal ind.	392	94	28	5
105	Sporting goods & toy industries	393	95	28	5
106	Sign and display industry	397	96	28	5
107	Floortile, linoleum, coated fabric	3993	97	28	5
108	Other manufacturing industries n.e.c.	391,3991,3992, 3994,3999	97	28	5
109	Repair construction	401-449	98	29	6
110	Residential construction	401-449	98	29	6
111	Non-residential bldg. construction	401-449	98	29	6
112	Road, highway and airstrip construction	401-449	98	29	6
113	Gas and oil facility construction	401-449	98	29	6
114	Dams and irrigation projects	401-449	98	29	6
115	Railway and telephone telegraphs construction	401-449	98	29	6
116	Other engineering construction	401-449	98	29	6
117	Construction, other activities	401-449	98	29	6
118	Air transport & services incidental	451,452	99	30	7
119	Railway transport & rel. services	453	100	30	7
120	Water transport & rel. services	454,455	101	30	7

Table 1 - Concordance between link codes (L), standard industrial classification codes (SIC) special PL codes, medium level (M) and small level (S) industry codes - concluded

L Level Industries Link Code	Industry Title	1980 SIC	Code PL	Code M	Code S
121	Truck transport industries	456	102	30	7
122	Urban transit system industry	4571	103	30	7
123	Interurban and rural transit systems	4572	103	30	7
124	Taxicab industry	4581	103	30	7
125	Other transport and serv. to transp.	4573-4575, 4589-4592, 4599,996,9991	103	30	7
126	Highway and bridge maintenance ind.	4591	103	30	7
127	Pipeline transport industries	461	104	31	7
128	Storage & warehousing industries	471,479	105	32	7
129	Telecommunication broadcasting ind.	481	106	33	8
130	Telecommunication carriers & other	482,483	107	33	8
131	Postal service industry	4841	108	33	8
132	Electric power systems industry	491	109	34	9
133	Gas distribution systems industry	492	110	34	9
134	Other utility industries n.e.c.	499	111	34	9
135	Wholesale trade industries	501-599	112	35	10
136	Retail trade industries	601-692	113	36	11
137	Banks, credit union and other dep. inst.	701,702,705,709	114	37	12
138	Trust, other finance and real estate	703,704,711-729, 741-743,7499, 7512,759,761	114	37	12
139	Insurance industries	731-733	115	38	12
142	Other business service industries	771,772,777,779	116	41	13
143	Professional business services	773,775,776	116	41	13
144	Advertising services	774	116	41	13
145	Educational service industries	851-859	117	42	13
146	Hospitals	861	118	43	13
147	Other health services	8621,863,865,866, 8671,8679,868, 8691-8693,8699	119	43	13
148	Accommodation and food service ind.	911-922	120	44	13
149	Motion picture and video industries	961,962	121	45	13
150	Other amusement and recreational services	963-969	121	45	13
151	Laundries and cleaners*	972	n.d.	46	13
152	Other personal services*	971,973,979	n.d.	46	13
153	Photographers	993	122	47	13
154	Misc. service industries	4842,982,983, 991,992,994, 995,9999	122	47	13

* Productivity measures are calculated at the most detailed level possible given the available data and reasonable hypotheses. In so doing, we obtain labour productivity measures for 152 industries of the link aggregation. Lack of data on capital stock restricts us to multifactor productivity estimates of 122 industries of the special PL aggregation. Moreover, no capital stock data is available for laundries and cleaners and other personal services.

Table 2 - Concordance between 1980 SIC industries for which there is no capital stock data and special aggregation PL industries

PL Level Industries		SIC industries for which there is no capital stock data	
Code PL	Industry Title	SIC code	Industry Title
1	Agricultural and related services industries	02	Service industries incidental to agriculture
3	Logging and forestry industries	05	Forestry services industry
6	Other metal mines	0615	Molybdenum mines
13	Service related to mineral extraction	092	Service industries incidental to mining
103	Transportation	996	Travel services
		9991	Parking lots and parking garages
114	Finance and real estate	72	Investment intermediary industries
		74	Other financial intermediary industries
		76	Insurance and real estate agent industries
117	Educational service industries	854	Library services
		859	Other educational services
119	Other health services	863	Non-institutional health services
		865	Offices of physicians, surgeons and dentists, private practice
		866	Offices of other health practitioners
		8671	Offices of psychologists
		8679	Offices of other social service practitioners

Table 3 - Special aggregations

Industry Title	Code S
Business sector industries	1-13
Business sector - goods	1-6,9
Business sector - services	7-8,10-13
Business sector - excluding agricultural & related services	2-13

APPENDIX 4

Quality Rating of Productivity Estimates and Related Data

This appendix provides quality ratings of labour productivity and related data and of multifactor productivity data, including the ratings of the input and output components used to estimate these measures. Quality ratings are provided for the last benchmark year as noted on the following tables. Data quality ratings for previous years may be found in preceding issues of this publication; data for the period following the benchmark year are deemed to be of lesser quality although no quality rating is provided.

1 - Quality Rating of Labour Productivity Estimates and Related Data

Like other components of the Canadian System of National Accounts (CSNA), the labour productivity and related data presented in this publication are derived from a variety of sources and subjected to various adjustments. Assessing the quality of the data thus raises difficulties similar to those pointed out in other CSNA publications. The labour productivity and related data presented in this publication are derived from:

(1) input-output tables, and real gross domestic product by industry, and,

(2) various surveys and censuses containing information on employment, hours worked, and labour income.

In rating various data our main interest lies more in year-to-year changes than in the levels of various constructs. No attempt will be made to establish a cardinal rating of there constructs used in productivity. However, based on an informed opinion, an ordinal rating will be attempted. The rank of 1 means most reliable, the rank of 2 means reliable and the rank of 3 means acceptable. All the series mentioned below received a rank. They are shown in tables 1 and 2.

(i) Real GDP at factor cost;
(ii) Persons at work;
(iii) Average hours;
(iv) Hours worked;
(v) Labour compensation;
(vi) Real GDP per hour worked;
(vii) Compensation per person at work;
(viii) Hourly compensation;
(ix) Unit labour cost.

Real GDP. The quality ratings of real GDP have been taken from Appendix A of the publication: *The Input-Output Structure of the Canadian Economy, 1991* (Catalogue 15-201).

Persons at work. For these data, the rankings have been determined as follows: in general a rank of 1 has been assigned to the most reliable estimates that are based completely on censuses, survey or administrative records[1] with minimum adjustments for coverage, valuation and classification. A rank of 2 has been assigned to less reliable census and survey data with adjustments for coverage. A rank of 3 has been assigned to all other sources for which it has been necessary to make adjustments for classification based on professional judgement, or that are estimated from proxy indicators. It is important to note that the rating of survey series is also based on their estimated coefficient of variation. In general, the coefficient of variation is inversely proportional to the size of the industry.

Relationship between the coefficient of variation and the ordinal ratings:

Ratings	Range of coefficient of variation
1	0.0% to 2.5%
2	2.6% to 5.0%
3	5.0% and over

1. See Appendix 2 for a full description of data sources.

Table 1 - Quality ratings of labour productivity and related data at aggregation level S and business sector, 1992

Industry title	Real GDP	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour cost
Agricultural & related services industries	2	3	2	3	3	3	3	3	3
Manufacturing industries	1	1	1	1	1	1	1	1	1
Construction industries	3	2	2	2	2	2	2	2	3
Transportation & storage industries	2	2	1	2	2	2	2	2	2
Communication industries	2	1	1	1	1	2	1	1	2
Wholesale trade industries	3	1	1	1	1	2	1	1	2
Retail trade industries	3	2	1	2	2	2	2	2	3
Community, business, personal services industries	2	2	1	2	2	2	2	2	2
Business sector industries	1	1	1	1	2	1	1	1	1

Table 2 - Quality ratings of labour productivity and related data for manufacturing industries at aggregation level M, 1992

Industry title	Real GDP	Persons at work	Average hours	Hours worked	Labour compensation	Real GDP per hour worked	Compensation per person	Hourly compensation	Unit labour cost
Food industries	1	1	1	1	1	1	1	1	1
Beverage industries	2	1	2	2	1	2	1	1	2
Tobacco products industries	2	1	2	1	1	2	1	1	2
Rubber products industries	1	1	2	2	1	1	2	1	1
Plastic products industries	1	2	2	2	1	1	1	1	1
Leather & allied products ind.	1	1	3	2	1	1	1	1	1
Primary textile & textile products industries	1	2	1	2	1	1	2	1	1
Clothing industries	1	1	2	2	1	1	1	1	1
Wood industries	2	2	1	2	1	2	2	1	2
Furniture & fixture industries	1	3	2	3	1	2	2	2	1
Paper & allied products ind.	1	1	2	1	1	1	1	1	1
Printing, publishing & allied ind.	2	2	3	3	1	2	2	2	2
Primary metal industries	1	1	2	2	1	1	1	1	1
Fabricated metal products ind.	1	3	2	3	1	2	2	2	1
Machinery industries	1	2	1	2	1	1	2	1	1
Transportation equipment ind.	2	1	1	1	1	2	1	1	2
Electrical & electronic products industries	2	2	2	2	1	2	2	2	2
Non-metallic mineral products industries	1	2	1	2	1	1	2	1	1
Refined petroleum & coal products industries	2	1	2	2	1	2	1	1	2
Chemical & chemical products industries	2	1	2	2	1	2	1	1	2
Other manufacturing industries	2	3	2	3	1	2	2	2	2

According to these criteria, the 1991 employment data from the Annual Survey of Manufactures at the S level of aggregation, for example, carry a ranking of 1. The main deficiency of the data comes from the fact that employment for a significant segment of employment in small businesses is estimated from Revenue Canada payroll files. Thus, a ranking of 1 has been assigned where less than 10.0% of the employment data is estimated from payroll data. A ranking of 2 has been assigned to data where more than 10.0% but less than 20.0% of the data is from this source. A ranking of 3 has been assigned above 20.0%.

In addition to being ranked according to the coefficient of variation, the data that come from the Labour Force Survey were also evaluated according to the proportion of multiple jobholders. These workers are only classified according to their primary job. It should be noted that the number of persons at work includes paid workers, self employed and unpaid family workers. Since for each industry there is at least one of the three categories estimated from the Labour Force Survey, all employment estimates are more or less affected by the classification problems of multiple job holders. A ranking of 1 has been assigned to the industry where multiple job holders represented less than 4.0% of total employment. For industries where this ratio is between 4.0% and less than 6.0%, the ranking is 2, while those where this percentage is 6.0% or greater obtained a ranking of 3. Consequently, the quality ordinal rating of employment data comes from at least two criteria[2] for all industries. The employment ratings shown in the tables of this appendix correspond to the rounded average of the assigned ratings according to the criteria described above.

Hours worked. The number of hours worked in each industry is obtained as the product of the number of persons at work and the average number of hours worked in each year. Except for manufacturing, all hours data are taken from the Labour Force Survey. As in the case of employment, the quality of average hours worked from this survey depends mainly on the estimated coefficient of variation of these series. All industries published at the S level obtained a ranking of 1, except for agriculture. For manufacturing industries at the M level, average hours worked come either from the Labour Force Survey or from the Annual Survey of Manufactures. When the source used is the Annual Survey of Manufactures, average hours worked were assigned a quality rating equal or lower than the one received by the number of persons at work. Since hours worked are obtained as the product of average hours worked and the number of persons at work, their quality rating corresponds to the rounded average of the two variables.

Labour compensation. Labour compensation is the sum of labour income of paid workers and the imputed labour income of self-employed workers. Since the estimates of labour income in the benchmark year come from administrative data and have been subjected to various Input-Output adjustments, these have a rating of one. However, in some industries (for example Agriculture, Construction, Retail Trade) there is a large number of self-employed workers for whom there is no direct measure of labour income and an imputation is made on the assumption that the hourly compensation of self-employed workers equals that of paid workers. Therefore, at aggregation level S the following rating criteria has been used. For industries, where the ratio of self-employed workers to persons at work is less than 10.0% the rating of labour compensation data is 1, where this ratio is 10.0% and 20.0% the rating is 2. For a ratio greater than 20.0% a rating of 3 has been assigned. According to these criteria, compensation data for all manufacturing industries at M level of aggregation have been assigned a quality rating of 1.

Labour productivity and related data. The quality ratings of ratios like real GDP per person at work, real GDP per hour worked and unit labour cost have been calculated as the rounded weighted average of the ratings for the two variables. For example, if the rating for real GDP is

2. Some industries at level S are obtained through the aggregation of their subgroups at a detailed level which are composed of more then one source. Thus, the rating at S level correspond to the average weighted rating of each component.

1, and employment is 2, then the rating for real GDP per person at work is 2.

2 - Quality Rating of Multifactor Productivity Estimates and Related Data

The quality rating for multifactor productivity at all levels of aggregation relies on the quality rating for gross output, intermediate inputs, capital, and labour, except for that of the business sector which depends on the quality rating for value-added, for capital, and for labour.

Intermediate inputs and gross output in current and constant prices and gross domestic product (GDP) carry the quality ratings described in Appendix A of *The Input-Output Structure of the Canadian Economy*, catalogue number 15-201. Capital input data quality is based on the ratings of business investment as given in the above mentioned publication. The quality ratings of employment, hours worked and labour compensation are discussed in section 1 of this appendix.

The quality ratings of basic data at the S and M aggregation levels (refer to Appendix 3 for more information on aggregation levels) are obtained by weighting the disaggregated quality ratings using value shares as weights. The quality assessment of multifactor productivity estimates is then based on the combined quality ratings of outputs, labour inputs, capital inputs, and, if applicable, intermediate inputs, according to their respective value shares. Quality ratings of basic data shown in tables 3 and 4 of this appendix are rounded to the nearest highest rating to account for the quality-increasing effect of aggregation.

Table 3 - Quality ratings for the components of multifactor productivity estimates by industry at aggregation level S and for the total business sector, 1992

Industry Title	Gross Output		Labour Inputs			Capital Inputs		Intermediate Inputs		GDP		MFP Index
	C$	K$	C$	Pers.*	Hrs.**	C$	K$	C$	K$	C$	K$	
Agricultural & related services ind.	2	2	3	3	3	2	2	2	2	2	2	2
Manufacturing industries	1	1	1	1	1	1	2	1	1	1	1	1
Construction industries	1	3	2	2	2	2	3	3	3	3	3	3
Transportation & storage ind.	1	1	2	2	2	1	2	2	2	2	2	2
Telecommunication industries	1	1	1	1	1	2	2	2	2	1	2	1
Wholesale trade industries	1	2	1	1	1	2	2	3	3	3	3	2
Retail trade industries	1	2	2	2	2	2	2	3	3	3	3	3
Business sector industries	...	...	2	1	1	1	2	...	...	1	1	1

* Persons at work ** Hours worked

Table 4 - Quality ratings for the components of multifactor productivity estimates by manufacturing industry at aggregation level M, 1992

Industry Title	Gross Output		Labour Inputs			Capital Inputs		Intermediate Inputs		MFP Index
	C$	K$	C$	Pers.*	Hrs**	C$	K$	C$	K$	
Food industries	1	1	1	1	1	1	2	1	1	1
Beverage industries	1	1	1	1	2	1	2	2	2	2
Tobacco products industries	1	1	1	1	1	1	2	2	2	1
Rubber products industries	1	1	1	1	2	1	2	1	1	1
Plastic products industries	1	1	1	2	2	1	2	1	1	1
Leather & allied products industries	1	1	1	1	2	1	2	1	1	1
Primary textile & textile products ind.	1	1	1	2	2	1	2	1	1	1
Clothing industries	1	1	1	1	2	1	2	1	1	1
Wood industries	1	1	1	2	2	1	2	1	1	2
Furniture & fixture industries	1	1	1	3	3	1	2	1	1	2
Paper & allied products industries	1	1	1	1	1	1	2	1	1	1
Printing, publishing & allied industries	1	2	1	2	3	1	2	2	2	2
Primary metal industries	1	1	1	1	2	1	3	1	1	1
Fabricated metal products industries	1	1	1	3	3	1	3	1	1	2
Machinery industries	1	1	1	2	2	1	3	1	1	1
Transportation equipment industries	1	1	1	1	1	1	2	2	2	2
Electrical & electronic products ind.	1	2	1	2	2	1	2	1	1	2
Non-metallic mineral products ind.	1	1	1	2	2	1	2	1	1	1
Refined petroleum & coal products ind.	1	1	1	1	2	1	3	2	2	2
Chemical & chemical products ind.	1	1	1	1	2	1	3	2	2	2
Other manufacturing industries	1	1	1	3	3	1	2	2	2	2

* Persons at work ** Hours worked

APPENDIX 5

Productivity and Related Data in CANSIM

Multifactor Productivity — Indices since 1961	CANSIM Matrices
Gross output productivity based on hours worked	7896
Intra-industry output productivity based on hours worked	7897
Value-added productivity based on hours worked	7898
Interindustry productivity based on hours worked	7899

Labour Productivity — Indices since 1946	
Persons at work	7922
Paid workers	7923
Hours worked of persons at work	7924
Hours worked of paid workers	7925
Real GDP per person at work	7926
Real GDP per hour worked of persons at work	7927
Labour compensation of persons at work	7934
Labour compensation per person at work	7935
Labour compensation per hour worked of persons at work	7936
Unit labour cost	7937
Real GDP	7938

Absolute values since 1961

Number of persons at work	7916
Number of paid workers	7917
Number of hours worked of persons at work	7918
Number of hours worked of paid workers	7919
Real GDP per person at work	7920
Real GDP per hour worked of persons at work	7921
Average hours worked per week of persons at work	7928
Average hours worked per week of paid workers	7929
Labour compensation of persons at work	7930
Labour compensation per person at work	7931
Labour compensation per hour worked of persons at work	7932
Unit labour cost	7933

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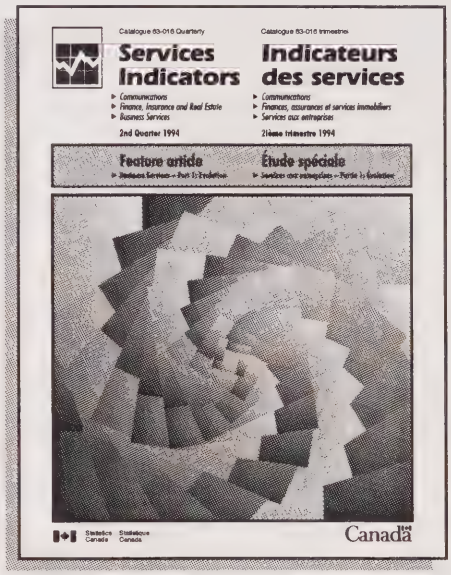

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